

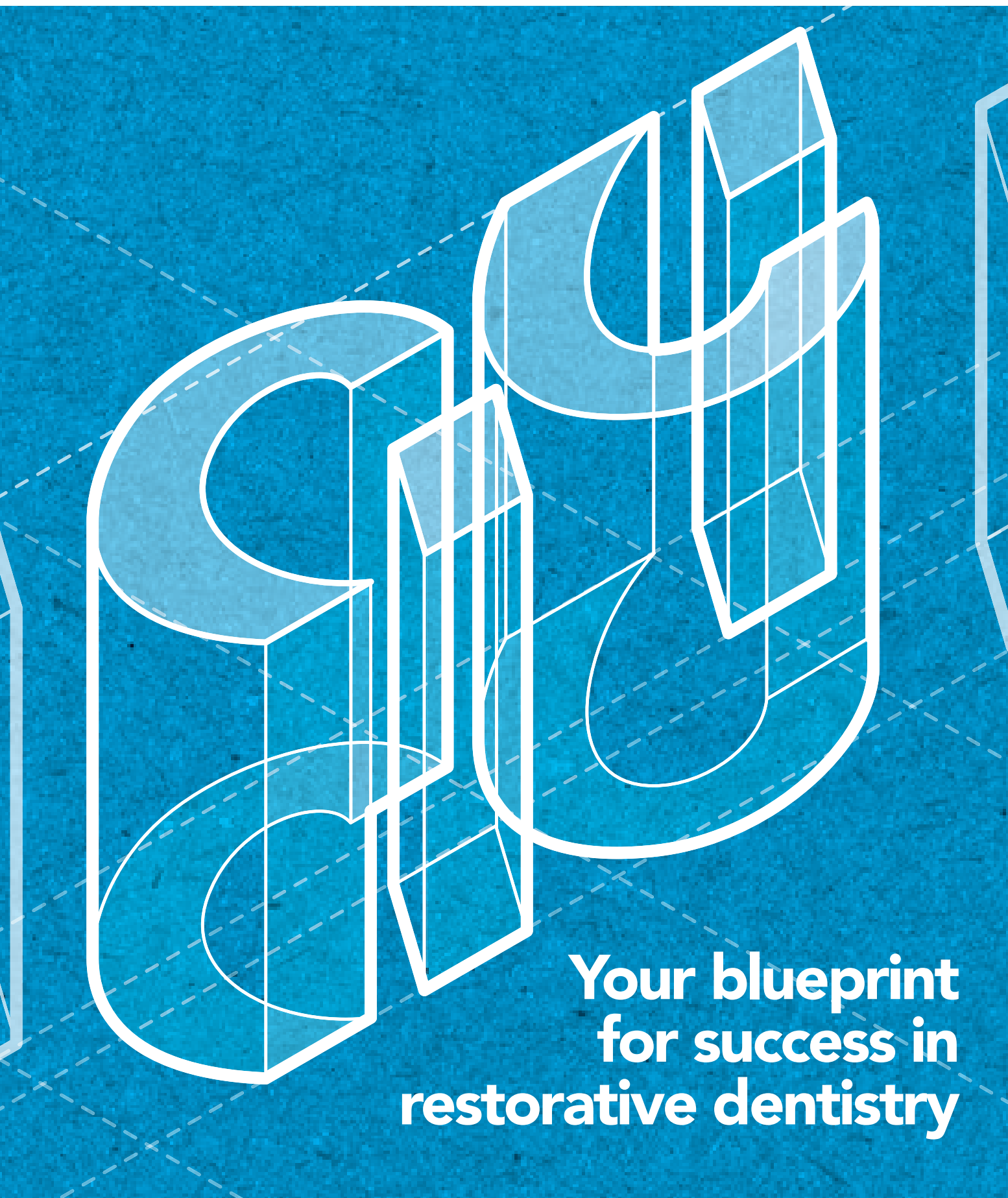
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2014

GC



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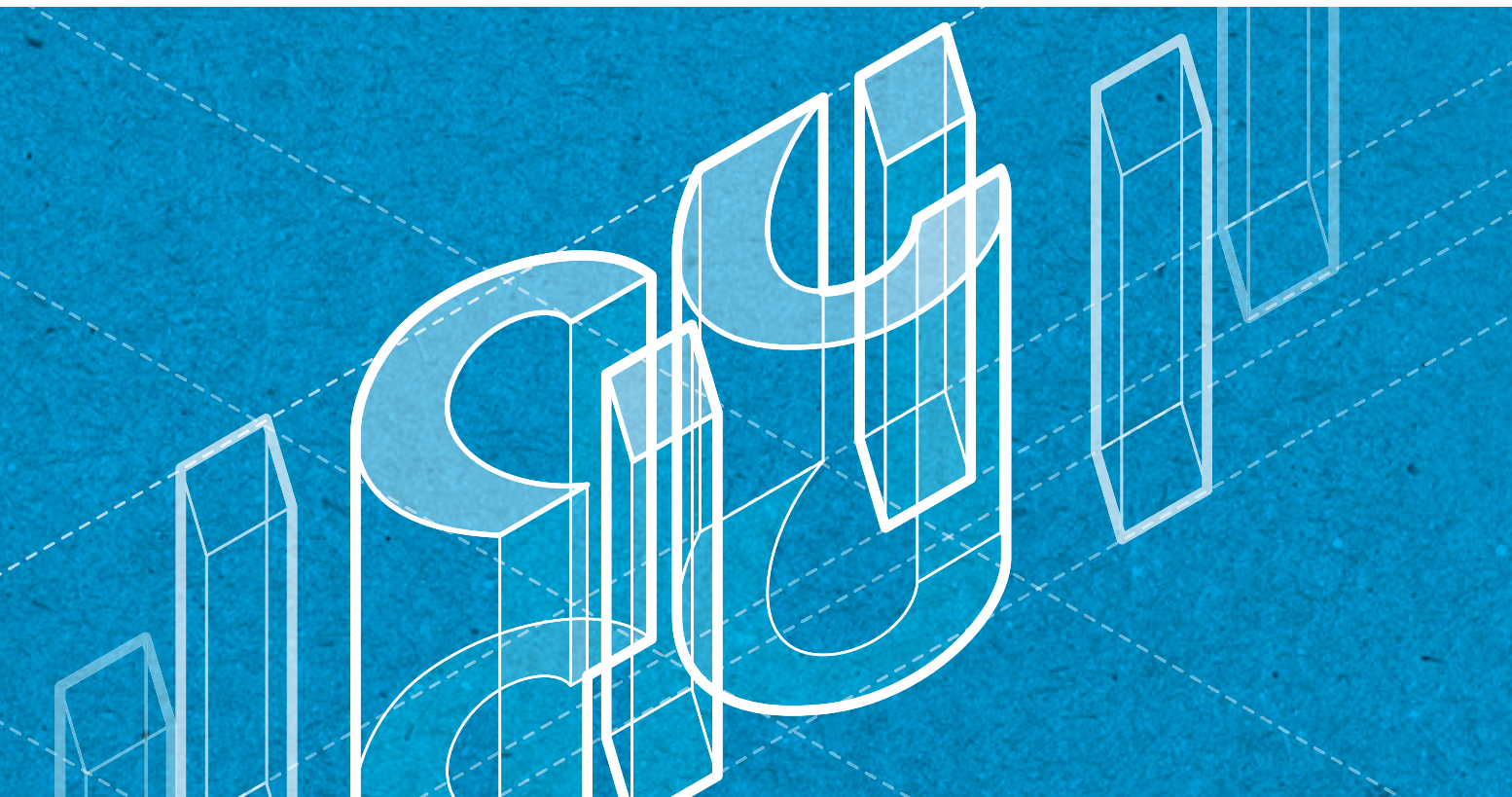
Over the last 5 years, the clinical performance of **EQUIA** has been highly appreciated by clinicians worldwide. Together with various ongoing studies worldwide, **EQUIA** is proving itself as a long lasting restorative alternative for your daily, routine practice*. This is only one of the impressive strengths of **EQUIA**. Find out more about the new dimension in restorative dentistry on www.gceurope.com

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Dear readers

Welcome to our third issue of GC Get Connected and thank you for reading!

I would like to take this opportunity to introduce myself to you as the new President of GC Europe, following my appointment to the role in April 2014. I look forward to building on the solid foundations laid by Mr Maedel during his two-year term and to make great strides for the company in key strategic areas.

Another notable development has been the opening of our international headquarters in Lucerne, Switzerland, a move which will help us to achieve long-term growth in the global oral health arena.

GC Get Connected is designed to give you an update on our latest activities, an insight into some of our leading products and a review of the science that demonstrates their efficacy.

In this issue I am proud to share with you articles by leading clinicians from around Europe, showcasing proven techniques, using a range of GC products and ultimately providing patients with superior dental care.



A special feature in this issue are the abstracts of systematic reviews on glass ionomer cements. In an effort to appraise the current clinical evidence regarding the merits of placing glass-ionomers as tooth restorations, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand in South Africa has conducted a series of reviews of randomised control trials and meta-epidemiological studies to draw some interesting conclusions.

I hope that you will enjoy reading this! Be sure to share this with your friends.
Best regards,

Michele Puttini
President, GC Europe

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

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:



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We want to hear from you! Please send your comments and feedback to connect@gceurope.com



GIVEAWAY:

FREE dental training event at GC Campus in 2015

With more than 30 years of knowledge and experience in glass ionomer technology, GC is recognised as the European leader in this field. Glass ionomer has proven to be clinically the most successful adherent system and as such is essential in every modern dental practice. You will find an answer to every clinical situation in our famous Fuji range of conventional and resin modified GICs.

GC Europe will host an exclusive training workshop for 20 dentists* in Leuven, Belgium in 2015. Register below for your chance to take part in this unique event.

Location: GC Campus, Leuven, Belgium

Language: English

Date: 13-14 February 2015

Course presenter: Dr Simone Moretto

Course topic: Glass ionomer cement

Included in the course: course attendance fees, models and materials, lunches, one group dinner, one night accommodation in Leuven (at a 3-4 star hotel), all transfers from and to Zaventem air port/railway station and transfers in Leuven during the training.



About the course presenter:

Dr Simone Moretto graduated in Dentistry from State University of Campinas in Brazil. She

then obtained the titles of Specialist, Master and PhD in Restorative Dentistry at the Sao Paulo University, Brazil, building part of her education at the BIOMAT Research Cluster at the Catholic University of Leuven in Belgium.

As a researcher she is widely published in peer reviewed journals and has presented at several international conferences.

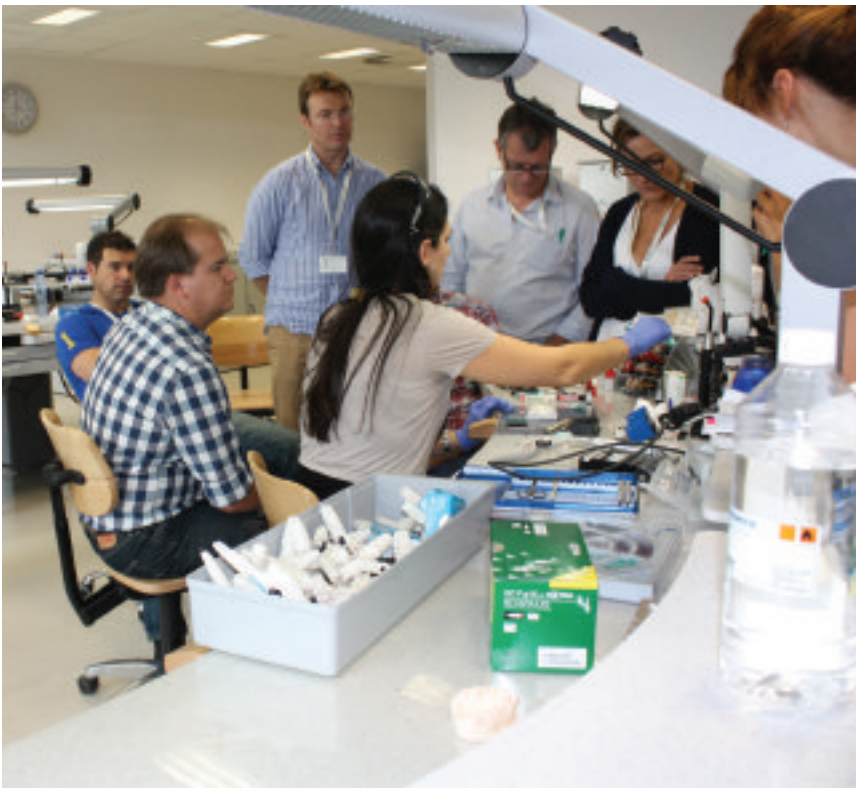
With 14 years of clinical experience and a solid academic formation, she has built up a high level of expertise,



which stood her in good stead when presenting Continuing Education courses and teaching as an Associate Professor at Ibirapuera University in Brazil.

She has recently joined GC Europe as a Technical and Training Manager complementing the existing team of experts and contributing to GC training courses with a well-balanced clinical and scientific point of view.

** Participants selected will be the first 20 people to register via the link below. Available to dentists in the EMEA region. Dentists from outside EMEA can contact their local GC branches for more information about courses.*

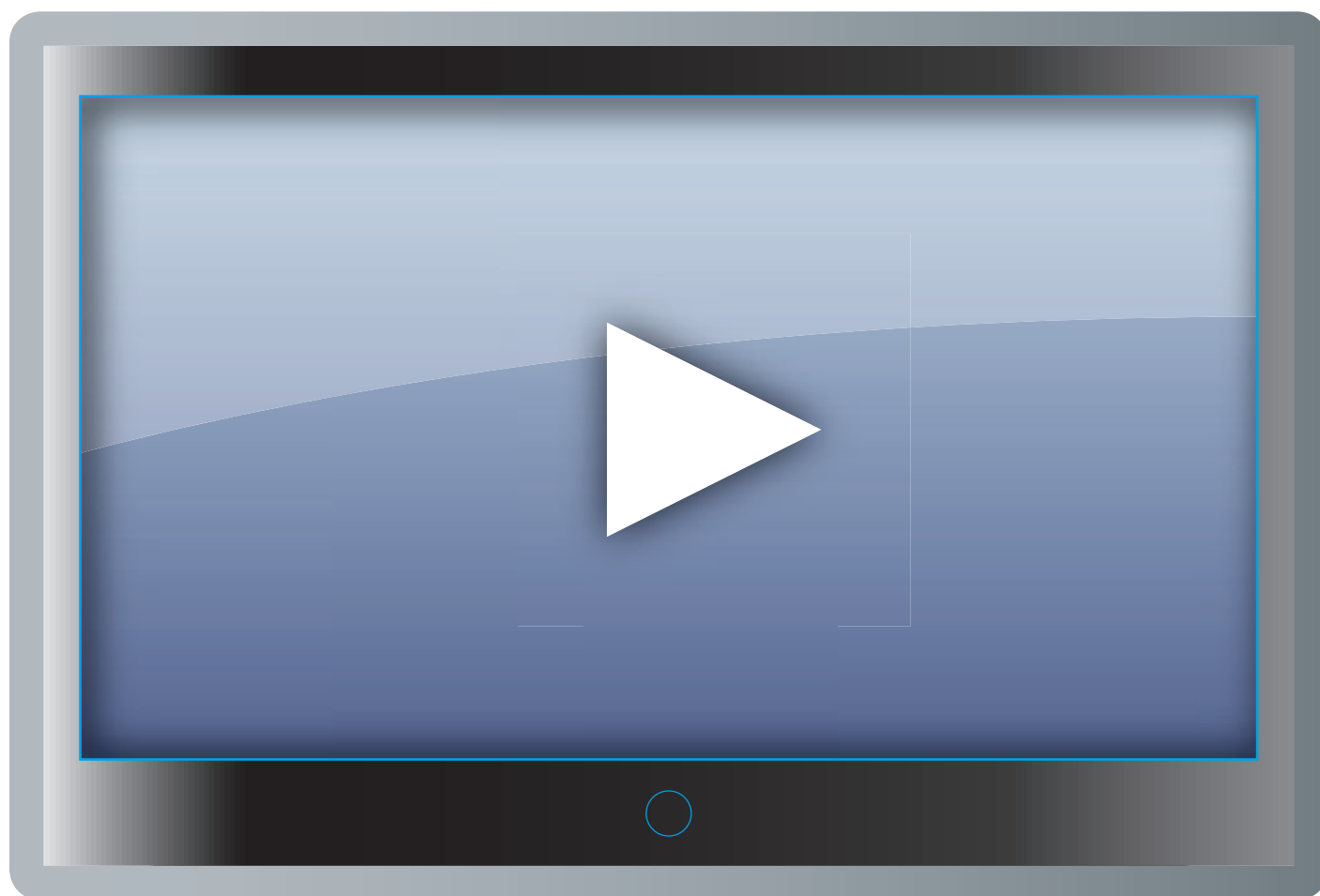


[CLICK HERE TO REGISTER](#)

WATCH: ART Technique using EQUIA

In this short video clip, Professor Evert van Amerongen, demonstrates the steps taken in the acclaimed ART technique of a Class II restoration using the Fuji IX GP EXTRA P/L restorative system.

Viewing time: 5:31 min



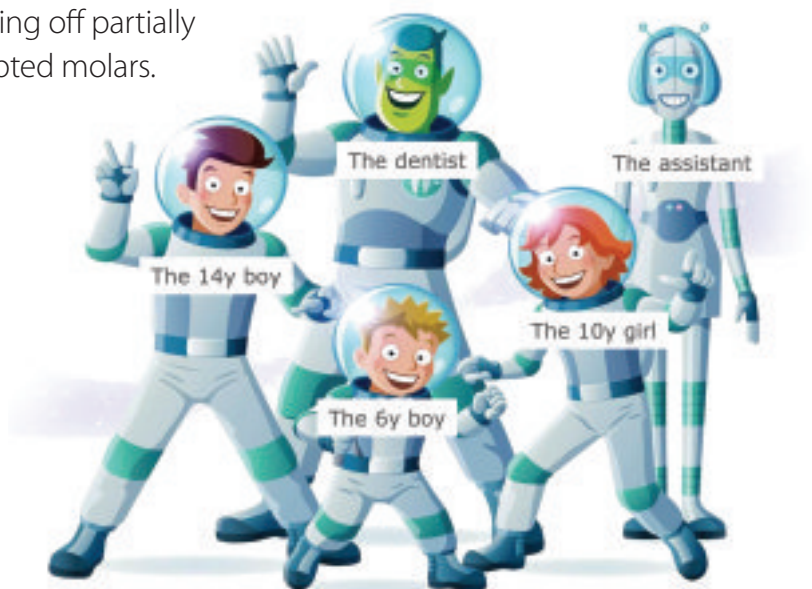
Introducing the Dentonauts: your partners in paediatric dentistry

The trend towards minimally invasive dentistry continues to grow and gain momentum worldwide. Clinical evidence is mounting, preventive treatment is becoming more accepted as a necessity by patients and medical insurance companies are beginning to recognise and cater for these developments. While the principles of minimum intervention might be simple enough to understand, their implementation while running a profitable dental practice can be challenging.

GC has identified paediatric dentistry as a key segment in preventive dentistry and has created a series of techniques, products and strategies to support dentists. The GC Dentonauts is a campaign that shares vital information on evidence-based preventive treatment protocols for children. Ranging from dentist and dental team education through to

patient communication tools, the Dentonauts campaign aims to inform dentists and parents alike while protecting the teeth of children.

Consisting of a set of cartoon characters of various ages, the Dentonauts work with the dental team to protect children's teeth against bacteria with specialised equipment to treat conditions such as molar incisor hypomineralisation, white spots and sealing off partially erupted molars.



Treatment Module 1: Protecting partially erupted teeth with GC Fuji Triage

It is standard practise for most dentists to wait for teeth to fully erupt before sealing them. This is due to the fact that proper isolation is not usually possible and that the effectiveness of bonding resin to a-prismatic enamel is poor.

At the same time, evidence shows that first and second molars can each take about 1.5 years to fully erupt(1) and that during this period, the caries risk is at its highest (2). In addition, occlusal pits and fissures are 8 times more susceptible to dental caries than smooth surfaces (3).

Fuji Triage is the answer

While it is difficult to isolate a partially erupted molar when the tooth is covered by an operculum and resin-based sealants need a dry environment for their bonding effectiveness (4, 5), GC's Fuji Triage is moisture

tolerant and offers chemical adhesion to tooth structure, even in a moist environment(6, 7).

It can be argued that resin-based sealants rely on enamel etching and micromechanical retention and that etching a-prismatic enamel does not provide a microretentive surface for an effective resin bond(6). However Fuji Triage, being a glass ionomer, allows chemical adhesion, even to a-prismatic enamel. Clinical studies indicate that Fuji Triage has similar retention compared to resin sealants at 24 months and report reduced instances of marginal stains and caries in the teeth(6). The retention of small amounts of glass ionomer sealants could be sufficient to prevent caries in the pits and fissures of teeth(8). Fluoride-modified hydroxy-apatite is much more caries resistant(6). Once the tooth is fully erupted, dentists still have the option to either renew

the existing glass ionomer sealant with a new glass ionomer or resin-based sealant.

Fuji Triage from GC, the glass ionomer solution for protecting partially erupted molars:



- Easy to apply
- No etching, no air drying, no bonding required
- Moisture tolerant
- Allows easy placement, even on partially erupted molars, without the use of a rubber dam
- Low viscosity, excellent flow
- Helps to penetrate into deep pits and fissures
- Unique pink colour
- Absorbs the heat from the curing light to speed up the setting and aids visualisation and monitoring
- Exceptionally high fluoride release
- Creates an acid resistant fluoride-modified hydroxyapatite.
- In addition, the fluoride release promotes remineralisation of the enamel if any initial carious lesions are present(6).

Protection in 5 simple steps

- Remove plaque/debris from the tooth and under the operculum. Avoid aggravating the operculum
- Treat the tooth with a dentine conditioner (20 sec) or cavity conditioner (10 sec) using a micro-brush and blot dry (do not desiccate)
- Isolate using cotton rolls and suction
- Spread a thin film of Fuji Triage over the pits and fissures
- For a quicker setting reaction, set the PINK Fuji Triage using 20-40 sec. of light-curing or let it self-set for 4 minutes

“The GC Dentonauts is a campaign that shares vital information on evidence-based preventive treatment protocols for children.”

Academic references

1. Dennison et al. Effectiveness of sealant treatment over five years in an insured population. JADA 2000;131(5):597-605.
2. National Center for Health Statistics. Health, United States, 2009 with Special Feature on Medical Technology. Hyattsville, Md.:2010:306-307.
3. H. Bohannan, Caries Distribution and the case for sealants. J Public Health Dentistry 1983;33:200-204.
4. Locker et al. The use of pit and fissure sealants in preventing caries in the permanent dentition of children. Br Dent J 2003; 195: 375-8.
5. Smallridge et al. Management of the stained fissure in the first permanent molar Int J Paediatr Dent 2000;10:79-83
6. Antonson et al. Twenty-four month clinical evaluation of fissure sealants on partially erupted permanent first molars: Glass ionomer versus resin-based sealant. JADA 2012;143:115-122.
7. Beiruti et al. Comm Dent Oral Epidemiol 2006;34:403-409
8. I Mejáre, IA Mjör. Glass ionomer and resin-based fissure sealants: a clinical study. Scand J Dent Res, 1990;98:345-350.

The diagnosis, prevalence and treatment of MIH

Professor Evert van Amerongen

Diagnosis

Molar Incisor Hypomineralisation (MIH) is an anomaly that can be observed on first permanent molars, regularly combined with a similar appearance on first or second incisors (Figures 1 and 2). Primary molars can also be affected, referred to as Deciduous Molar Hypomineralisation (DMH) (Figure 3).

Because only a limited number of teeth show an enamel hypomineralisation, it can be concluded that the disturbance of the mineralisation was limited to a demarcated period in the formation of the enamel of the entire dentition. This limitation can even be observed on the affected teeth themselves: the hypomineralisation can vary from a small restricted area to a severe encroachment of the entire tooth.

Because the development of the crown of the first permanent molar and incisor takes place in the first

three years after birth, this is also the period that we have to focus on in our diagnosis, when MIH is observed after eruption a few years later. Regarding DMH in the primary dentition, the focus should be on the period of pregnancy of the mother.

The clinical features of MIH can be described as:

- the enamel is locally opaque and discoloured (varying from white to brown) (Fig. 4)
- the enamel is soft and brittle
- the enamel is porous

As a consequence these teeth:

- can be very sensitive for caries. Due to the brittleness, parts of the enamel can easily break away and create retention places for plaque (Fig. 5). Moreover, because the enamel is poorly calcified, caries will develop easily in the direction of the dentine, rapidly creating very large lesions. This also occurs when the



Figure 1. MIH on a first permanent molar

Figure 2. MIH on a lateral incisor

Figure 3: Deciduous Molar Hypomineralisation (DMH)

Figure 4. Small hypomineralisation, just on the tips of the cusps

Figure 5. Larger hypomineralisation (note with a carious lesion due to brittleness).

hypocalcification is localised at the fissures.

- are often very painful. When even brushing or rinsing with cold water is a problem for the child, brushing in these areas of the mouth will be avoided. Plaque will accumulate and remain undisturbed and these circumstances will contribute to a rapid caries process.
- are difficult to anaesthetise. The extreme sensitivity of some of these molars makes them even more difficult to anaesthetise, which is often necessary to perform treatment, whether it be the application of a sealant or a restoration.

Prevalence

Probably due to differences in the interpretation of MIH in the past, there is a large difference in the prevalences of this development disturbance. The percentages as described in different studies vary between 4% and 25%. Different studies in the Netherlands show a prevalence of 9-10% in 6- and 11-year-old children respectively. DMH was observed in 5% of 5-year-old children.

Treatment options

Prevention

Due to the fact that the occlusal surfaces of hypomineralised molars are particularly prone to develop caries very rapidly, every thinkable measure should be taken to prevent this condition from occurring. What

is needed in these cases is extensive oral hygiene instruction to parents, including motivational interviewing strategies, glass-ionomer sealants in the eruption phase of these molars and resin sealants when eruption is finished, fluoride applications and dental visits with relatively small intervals.

If a patient complains about pain during inspection with the air and water syringe and during toothbrushing, then sealing the teeth under local anaesthesia can decrease the sensitivity. However, even to get these molars properly anaesthetised can sometimes be difficult. It is worthwhile in these cases to consider an intra-osseous administration of a local anaesthesia, such as Stabident (Fairfax Inc) or the Quick Sleeper (Dental Hi Tec) (Figures 6 and 7).

Although there is no sufficient evidence yet, the application of a hydroxyapatite paste for 30 seconds seems to be effective in the reduction of pain. Kuraray claims that its material, Teethmate Desensitizer, helps with the treatment of sensitive teeth as a result of exposed dentine in the oral cavity (Figure 8). The first clinical experiences give the impression that it is also beneficial for MIH patients, immediately after the application and lasts up to a few months afterwards. It is possible that regular application of casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) found in tooth crème like Tooth Mousse (GC) can extend the period of sensitivity reduction and improve remineralisation.

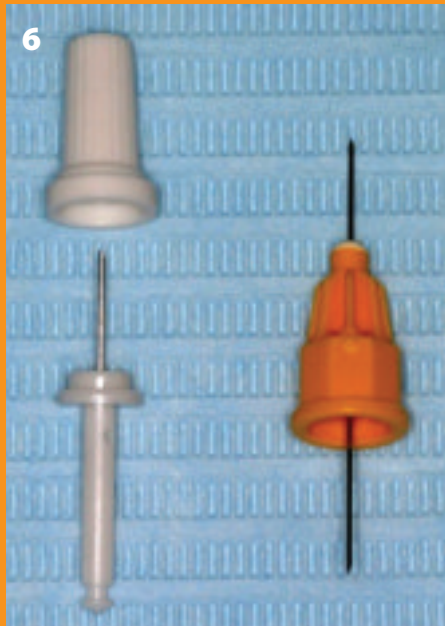


Figure 6. Stabident, special bur and needle

Figure 7. Quick Sleeper. The needle also functions as a bur

Figure 8. Teethmate Desensitizer

Figure 9. Tooth Mousse

Figure 10. Preparation for a stainless steel crown

Figure 11. The stainless steel crown placed



Invasive treatment of the molars

If caries has developed into the dentine layer, it can increase rapidly in size and depth. As with prevention, early diagnosis is essential: the sooner the cavity is restored, the better. In the case of relatively small (occlusal) lesions a high viscosity glass ionomer restoration can be considered. The outline of the preparation does not necessarily need to extend to sound enamel. In cases of marginal breakdown of the surrounding enamel and/or the GIC restoration, secondary caries will not easily develop because of the higher fluoride concentration in the adjacent dentine and enamel, thanks to the release from the GIC.

If using a composite resin, the recommended restoration material, it is also advisable for the same reason, to first apply a liner of GIC. Where possible, the preparation should be extended to sound enamel in order to avoid marginal gaps caused by the breakdown of brittle enamel.

If the carious lesion is large, it is obvious that the condition of the pulp should be examined. In a number of

cases pulp treatment will be necessary, varying from an indirect pulp capping, a direct pulp capping, a localised pulp amputation and a full pulp treatment after extirpation.

The choice will be dependent on the measure of pulpal inflammation and the measure of root formation. In all these cases a stainless steel crown, cemented with a glass ionomer luting material, should be the restoration of choice. One has to keep in mind that often the first permanent molars (or deciduous molars) are similarly affected by MIH (or DMH). This means that the extension of the caries in those teeth is more or less similar. A stainless steel crown (SSC) is therefore also indicated for the other molars. (Figures 10 and 11)

A SSC on a primary molar is the best restoration modality there is. It can function perfectly till the moment of exfoliation. For permanent molars this is not the case. SSC are only a semi-permanent or temporary restoration. This means that at certain point another type of treatment should follow. This can be a full crown (i.e. of porcelain) at an age of around 18, or extraction, preferably at a much younger age.

In all cases of extensive MIH the option of extraction should be considered. Extraction of the first permanent molar, followed by the eruption and mesial movement of the second molar (whether or not supported by orthodontic treatment) has the advantage of 'getting

"In all these cases a stainless steel crown, cemented with a glass ionomer luting material, should be the restoration of choice"

permanently rid of problem-teeth! The best time to extract is when the bifurcation of the roots of the second permanent molar is visible on an x-ray photograph. This is normally the case around the age of 9-10. A consultation of an orthodontist prior to the extraction is always recommended.

Invasive treatment of incisors

In most cases where one or more incisors show opacities, treatment is from a health perspective and almost never indicated. Only if aesthetics is an issue (so, if the patient complains about it), micro-abrasion with a HCL and/or phosphoric acid solution or a facing with composite (or later with porcelain) are the best treatment options.

In conclusion several aspects can be highlighted:

- The prevention of caries in MIH and DMH is even more important than 'normal' dentition
- For pain control there are, besides the regular local anaesthesia, the intra-osseous variant and the



About the author:

Evert van Amerongen is associate professor and used to be (till his retirement) head of the Section of Pedodontology of ACTA, an integrated faculty of VU University and the University of Amsterdam. He has set up various international projects to support local dental institutions. Under his supervision, many Master's students from the Pedodontology section conducted research in developing countries. He is the editor of Case Reports in Paediatric Dentistry and lectures frequently on the subject of paediatric dentistry.

application of a desensitising hydroxyapatite (whether or not followed by the application of CPP-ACP tooth crème)

- Glass ionomer, whether or not combined with another material (composite or SSC) reduces the chance of secondary caries ('the seal is the deal')
- The extraction of hypomineralised molars is always worthwhile to take in consideration.
- The treatment of opacities on permanent incisors is rarely necessary.

Want more tips on detecting, diagnosing and treating MIH? Ask the expert!

Click here watch this FREE webinar by Prof David Manton on how to identify the presence of MIH at an early stage and to be able to create an effective treatment plan.

Topics covered in the webinar:

- Why MIH is such a big concern
- Prevalence rates of MIH
- Diagnosis (differential diagnoses)
- Treatment planning issues

- Preventive care -- Which products to use- why and how?
- Interventive care – Which products to use and why?

Creating an aesthetic root canal post with everStickPOST

Assistant Professor Anja Baraba

Currently, fibre-reinforced composites (FRCs) can be used for many applications such as direct splints, endodontic posts, fixed partial dentures, bridges and crowns. In FRC technology, different types of continuous glass fibres can be used: E-glass fibres, S-glass fibres, and R-glass fibres (1). everStick fibres (GC) are composed of unidirectional and silanated E-glass fibres embedded into an organic polymer structure. This unpolymerised organic matrix (Figure 1) is a mixture of polymethyl methacrylate (PMMA) and bisphenol A-glycidyl methacrylate (Bis-GMA), creating a semi-interpenetrating polymer network (semi-IPN) (2). The main advantage of the semi-IPN is the ability of this structure to be dissolved by fresh monomers from adhesive resin, creating the so-called secondary IPN (3), and increasing the potential of adhesion to other resins

and to the tooth structure. Therefore, the secondary IPN bonding is most valuable when pre-fabricated FRC restorations must be bonded to hard dental tissues, or be repaired. Each everStick fibre bundle is covered with a protective layer made of PMMA which protects glass fibres from the oral environment.

One of the indications for the use of everStick fibres are posts placed after endodontic treatment. everStickPOST fibres are available in three different diameters: 0.9, 1.2 and 1.5 mm. Depending on the diameter of the post, each post contains 1600, 2000 or 4000 individual glass fibres. These posts are indicated for individually formed aesthetic posts, especially for wide, oval and curved root canals. In fact, they can be adapted to fit the shape of the canal, thus reducing the risk of root perforation. These customisable posts also ensure that

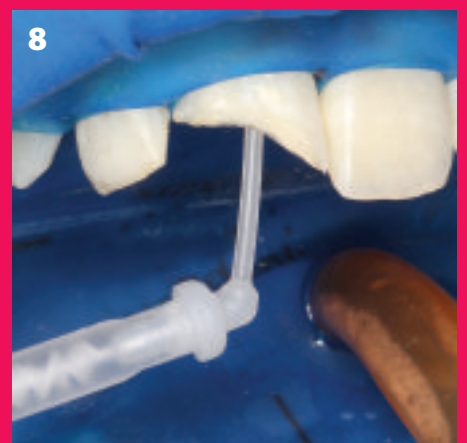
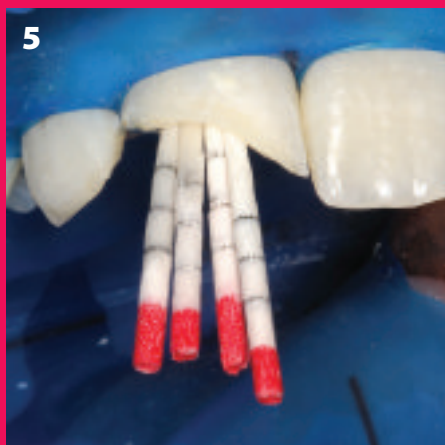
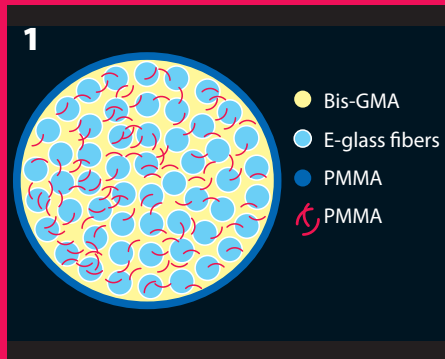


Figure 1. The IPN matrix

Figure 2. Trauma of the right upper central incisor

Figure 3. Isolation using a rubber dam

Figure 4. Irrigation of the root canal preparation with saline solution

Figure 5. Drying the root canal with paper points

Figure 6. Creating a customised post by condensing laterally shorter pieces onto the main post

Figure 7. Individually formed everStickPOST

Figure 8. Injecting the dual-cure self-adhesive cement G-CEM LinkAce

the remaining tooth structure is not weakened by an invasive preparation. Their elastic properties are similar to those of dentin, which enables an even distribution of stress on the root structure, and thus reduces the risk of root fractures (4).

Case Report

The patient, aged 13, came to the dental office because of a trauma of the right upper central incisor (Figure 2). Endodontic treatment was performed and a radiograph was taken to ensure the complete obturation of the endodontic space. Since the tooth was damaged to a considerable extent and the root canal was wide and oval in mesio-distal direction, everStickPOST was selected. Indeed, it allows to create an individualised post, whose shape is similar to the one of

the canal. After finishing the enamel margins, the tooth was isolated using rubber dam (Figure 3). The enamel was etched with 37% orthophosphoric acid for 10 seconds, washed and dried. Preparation for the post was performed using Gates Glidden burs and 2/3 of the length of the root canal filling was removed from the root canal, preserving the anatomical shape of the root canal. Saline solution was used for irrigation of the post space preparation (Figure 4). After drying the prepared root canal with paper points (Figure 5), everStickPOST size 1.2 was selected. A first post was inserted in the prepared root canal. Subsequently, two other shorter posts were placed and condensed laterally (Figure 6), so as to form one single post (Figure 7). The completed post was removed from the root canal while still soft and protected from the ambient light until cementation. The post was cemented using dual cure, self-adhesive cement (G-CEM LinkAce, GC). The cement was injected directly into the root canal (Figure 8) and the individually formed post was inserted in the root canal (Figure 9). everStickPOST and the cement were light cured for 40 seconds from the top of the post (Figure 10). G-ænial Bond (GC) was applied in one layer and left for 10 seconds after which it was air blown for 5 seconds and polymerized for 10 seconds. The tooth was restored with G-ænial composite using the layering technique (Figures

“The elastic properties of customisable posts are similar to those of dentin, which enables an even distribution of stress on the root structure, and thus reduces the risk of fractures”



Figure 9. Inserting the customised post in the cement

Figure 10. Light-curing after injection of the cement in the canal and placement of the post

Figure 11 a, b, c: Stratification steps using G-aenial Anterior: Enamel Shade JE, Inside Shade AO3 and Standard Shades A2, A1, B1)

Figure 12. Composite build-up before finishing & polishing

Figure 13. Final polished restoration

Figure 14. Recall at one month

11a, b, c). Stratification was initiated with a 1.5 mm thick layer of Junior Enamel (JE) to reconstruct the palatal surface. After light-curing this first layer of composite resin, the next layer of composite was A2 Standard Shade which was used in the proximal areas to create the proximal surface. An Inside Shade (AO3) was used to reconstruct the dentin segment. Near the incisal edge, the AO3 composite material was formed into lobes in order to mimic mammelons of the incisor teeth. The labial surface was contoured by combining two Standard Shades: A1 and B1. The final layer of Enamel Shade JE was applied on the labial surface to finish the restoration (Figure 12). The composite restoration was then finished and polished (Figure 13). The patient came for a recall visit one month after the direct composite restoration was done (Figure 14).

References:

1. Vallittu PK: Compositional and weave pattern analyses of glass fibers in dental polymer fiber composites. *J Prosthodont* 1998;7:170-6.
2. Sperling LH. Interpenetrating polymer networks: an overview. In: Klemper D, Sperling LH, Utracki LA, editors. *Advances in chemistry series*, 239. 1994. P. 3-39.
3. Lastumaki TM, Kallio TT, Valittu PK. The bond strength of light-curing composite resin to finally polymerized and aged glass fiber-reinforced composite substrate. *Biomaterials* 2002;23:4533-9.
4. Sidoli G, King P, Setchell D. An in vitro evaluation of a carbon fiber-based post and core system. *J Prosthet Dent* 1997;78:5-9.



About the author

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 has participated actively in national and international congresses. She is a member of Croatian Dental Chamber, Croatian Endodontic Society (CES), European Society of Endodontology (ESE) and Croatian Society of Aesthetic Dentistry.

My recipe to achieve a G-ænial smile

Rodolphe Zunzarren

When choosing a composite for my practice, I always consider its mechanical properties, its consistency, its handling and how it looks at the end in terms of surface gloss and aesthetics. These characteristics are key to me because they allow me to create durable restorations that remain aesthetic over time.

When it comes to the polishing procedure itself, it's essential to achieve a high lustre in anterior restorations. I find that with certain polishing procedures, the composites have a smooth surface but keep a matte aspect. I think it is important to get as close as possible to the natural aspect of a tooth, when dry or moist.

My polishing procedure typically differs from case to case. In anterior cases, the result must be aesthetically flawless because the restorations are very visible. In the posterior area, the procedure can be less demanding. Currently, I follow three steps in all my anterior restorations: a silicone point to smoothen the surface, a goat hair brush and diamond paste to polish, and finally a cotton polisher with diamond paste to achieve a high lustre.

I find that one of the most common

I find that one of the most common mistakes a dentist can make is not to allocate enough time for the polishing step. In my opinion, this, in addition to creating the morphology are the two fundamental steps, even more important than the layering step.

mistakes a dentist can make is not to allocate enough time for the polishing step. In my opinion, this, in addition to creating the morphology are the two fundamental steps, even more important than the layering step. Here are some case studies that demonstrate my approach to polishing and the results I have achieved.



About the author

Dr Rodolphe Zunzarren graduated from Bordeaux University, where he worked as an assistant in conservative odontology in the university hospital for four years. Dr Zunzarren now has a private practice in Biarritz, France. He is the author of the "Guide clinique d'odontologie" (published by Editions Masson), and regularly gives lectures for continuous education programmes in different fields such as restorative dentistry, endodontology and implantology.



Polishing procedure for anterior restorations

A 44 year-old patient came to the practice because of aesthetic concerns. The clinical examination revealed old infiltrated composite restorations affecting the aesthetics of the patient's smile. These restorations were removed and recreated.

1. Pre-operative view

2. Placement of the rubber dam

3. Removal of old restorations using a round-head bur with green stripe

4. The margins of the cavity are chamfered using a round-head bur with green or red stripe

5. Polishing of the cavity margins using a silicone point for polishing: Diacompo® Blue (9400.204.030, Komet)

6. Selective etching of the enamel for 10 seconds

7. Thorough rinsing for 10 seconds, followed by a soft air-blow

8. Application of chlorohexidine 0.2% on the exposed dentin for 30 seconds in order to inhibit the metalloproteinases. Soft air-blow.

9. Vigorous application of a self-etch bonding : G-ænial® Bond (GC) for 10 seconds, followed by strong air-blow for 5 seconds

10. Light-curing for 10 seconds

11. The composite is compressed using a CompoThixo instrument (Kerr)

12. Polymerisation for 20 seconds

13. Application of a thin layer of G-ænial Anterior AE (Adult Enamel) using a spatula (Heidemann 1)

14. Alteration of the shape of the restoration using a finishing bur (« Q® » H48LQ.314.012, Komet)

15. The surface of the composite is smoothed using Diacompo® Blue (9400.204.030, Komet) under spray

16. Polishing using Diapolisher Paste (GC) and a natural goat hair brush (9638.900.190, Komet) on a mandrel (303.204, Komet) at low speed and without spray

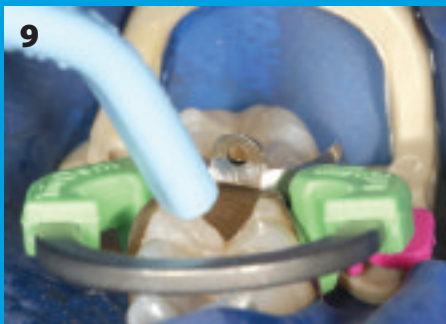
17. Achieving a high shine using a cotton buffing wheel (9628.900.200, Komet) on a mandrel at high speed

18. Post-operative view

19. After removing the rubber dam. The teeth are dehydrated because of the rubber dam; the final aesthetic result will only be visible after rehydration.

20. Three-month recall





Polishing procedure for posterior restorations

A 26 year-old patient visited the practice for a dental check-up. The slight dischromy of the distal and mesial marginal ridges of teeth 46 and 47 seems to indicate the presence of carious lesions. The x-ray examination confirmed the clinical inspection, and highlighted the presence of carious lesions type Sista 2.3. Direct restorations were the selected treatment method.

1. Pre-operative view

2. Elimination of non-supported enamel using a round-head bur with green stripe on a turbine

3. Carious dentin is exposed

4. Curettage of carious dentin using a zirconia bur (Cerabur KSM 204 018, Komet) at low speed and under spray

5. Placement of the rubber dam

6. Placement of the matrices (System V3 Ring Triodent, WAM)

7. Application of a glass ionomer cement (EQUIA, GC) on the dentin margins

8. Vigorous application of G-aenial Bond (GC) for 10 seconds

9. Strong air-dry for 5 seconds

10. Light-curing for 10 seconds

11. Application of a layer of G-ænial Posterior P-A3 using a Compothixo instrument (Kerr)



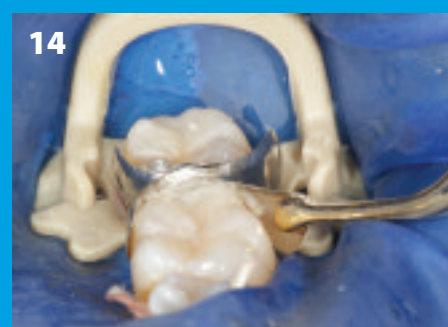
12. Sculpting the morphology using a Heidemann 1 spatula



13. Operative view before removing the matrices



14. Removal of the matrices



15. Operative view before the finishing steps



16. Alteration of the occlusal shape of the restoration using a finishing bur Q (H390Q.314.018, Komet)



17. Alteration of the proximal shape of the restoration using a finishing bur Q (H48LQ.314.012, Komet)



18. Operative view after finishing



20. Polishing using a brush and Diapolisher Paste (GC) at low speed and without spray



21. Post-operative view



Type of Cure

Type of Set

Product

Key Features

So, you want to use a GC Glass Ionomer Restorative

Here's a guide explaining when and why to use each product from our GIC portfolio

Start here

Is the restoration stress-bearing?

Yes

SELF-CURE
Note: Light-cure the coat for 20 sec.

Fast Set

EQUIA



- Superior physical properties thanks to synergy between coat and fill
- Superior aesthetics, due to higher translucency
- Proven performance in posterior long term bulk fill application.
- Packable for easy posterior application

Light-cure

Controlled Set

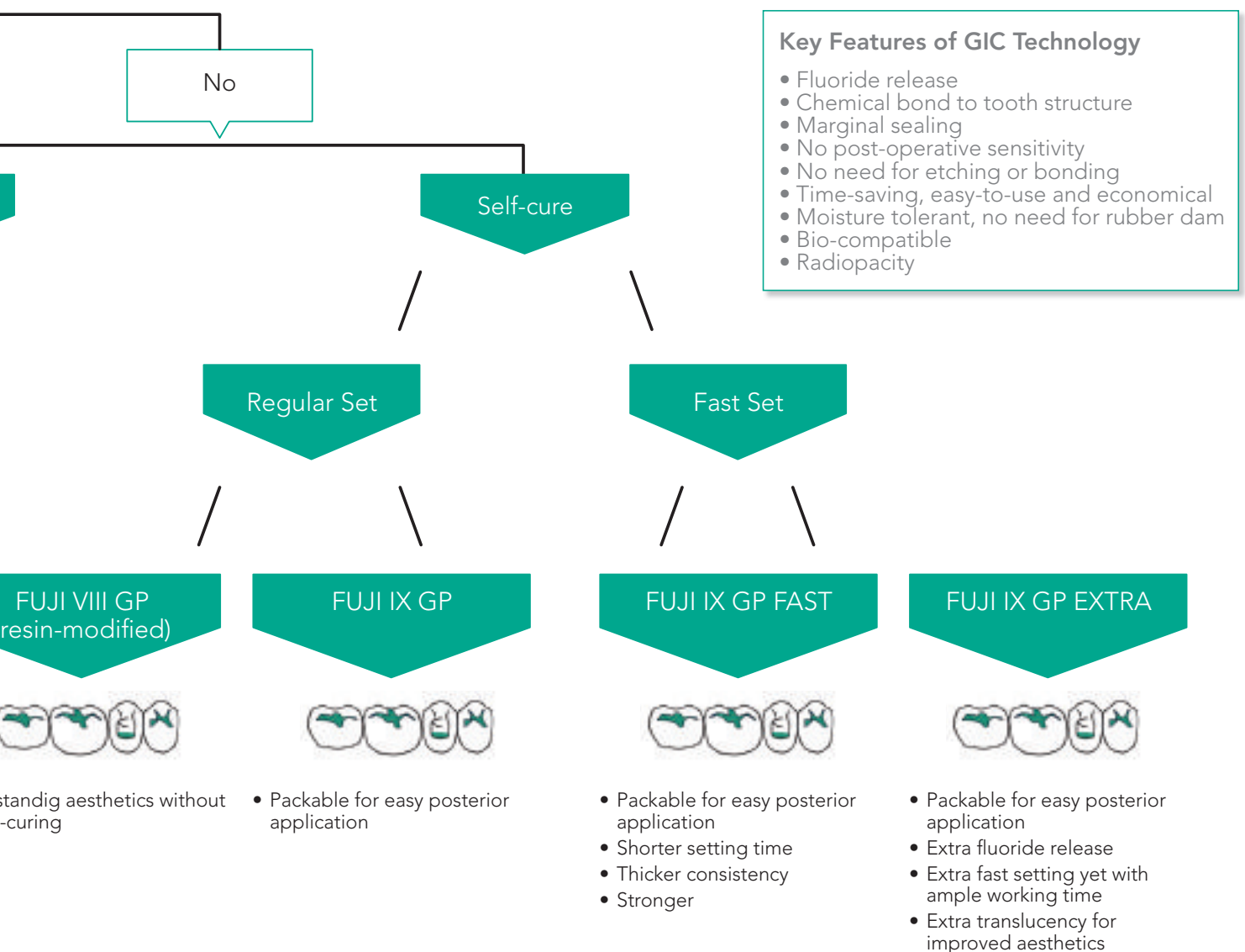
FUJI II LC (resin-modified)



- Outstanding aesthetics
- Setting on demand (dual curing) for immediate finishing

- Outstanding aesthetics

When to use which GC glass ionomer restorative?



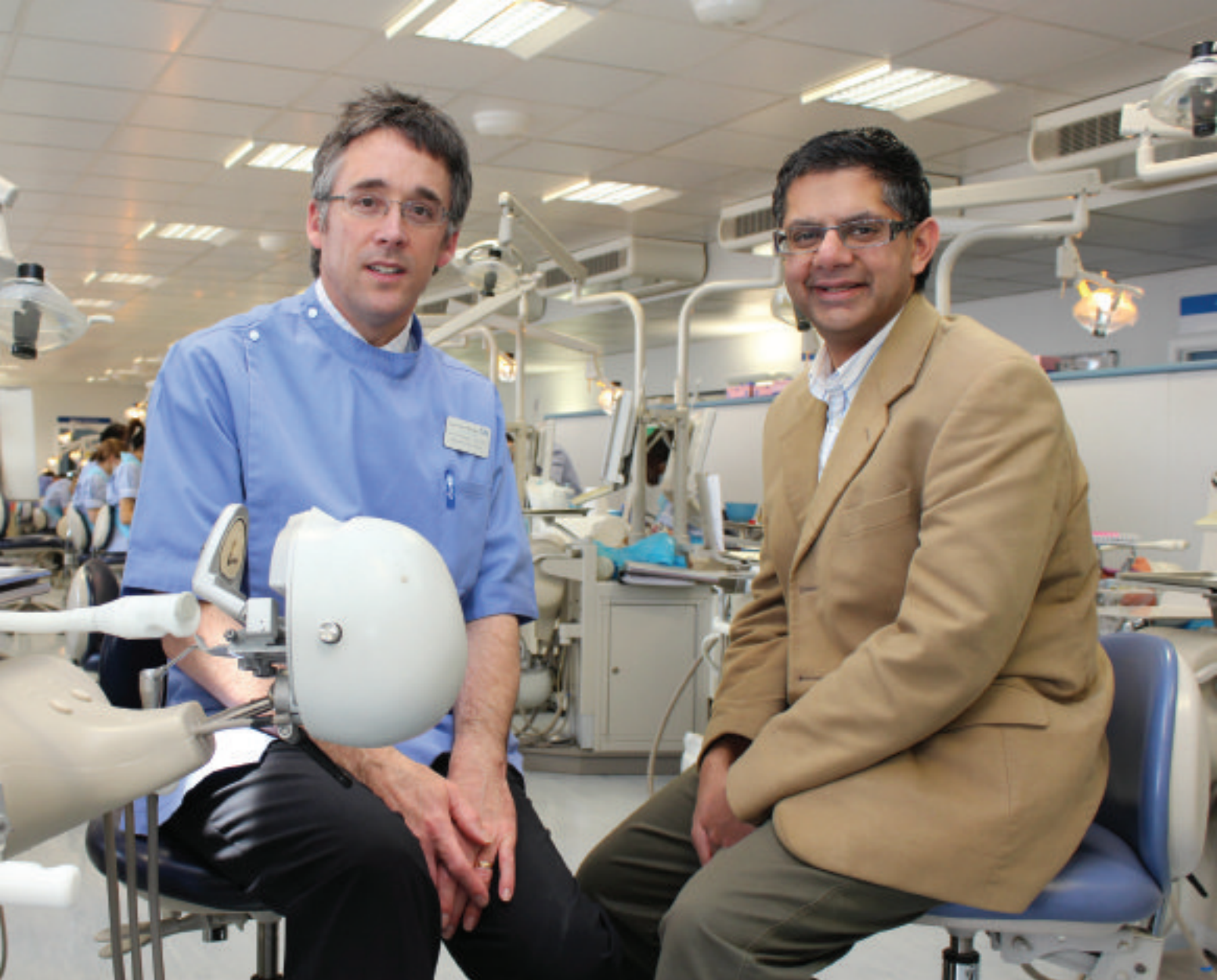
UK's leading dental school advances Minimum Intervention Dentistry training through new postgraduate qualification

Dentists can now enhance their skills in minimum intervention dentistry thanks to a unique postgraduate master's degree at King's College London Dental Institute. The recently launched distance learning-based Master's in Advanced Minimum Intervention Dentistry (AMID) is designed for busy dentists to develop skills in preventive and tooth-preserving operative dentistry alongside patient and clinical practice management, while maintaining their day-to-day practice responsibilities.

"Having researched, practised, educated, written and lectured in this area for many years, I felt it was time to develop both the undergraduate and postgraduate curricula in modern dental education to reflect this paradigm shift in the fundamental patient-centred delivery of dental care," said AMID programme leader Professor

Avijit Banerjee.

The AMID MSc provides the latest evidence-based knowledge in Minimum Intervention care and minimally invasive tooth tissue preserving operative dentistry, enabling participants to integrate this patient care and oral health philosophy with suitable marketing and practice management strategies, into their general or private practice. The course has support from companies, such as leading dental materials and MID products manufacturer, GC UK, who will supply relevant materials for use in dental practices throughout the duration of the programme. GC has championed the MID concept for many years in the industry through the development of key products and supporting education and research. Other related professional dental companies are also supporting the



programme with one-year course fee scholarships available for suitably meritorious applicants.

"It is the only programme available that educates dentists (and their teams) to change completely the delivery of care they provide patients and the framework they provide it in," Professor Banerjee elaborated. "The units and modules of the course have been designed to integrate seamlessly with daily practice. What is learned one day can be put into practice the very next! Assignments are tailored to be of benefit not only with regard to the academic content, but also useful for real practice audit and development," he continued.

"It is the only programme available that educates dentists (and their teams) to change completely the delivery of care they provide patients and the framework they provide it in"

For entry requirements and information on how to apply please click here or email distancedentistry@kcl.ac.uk

The programme is delivered by a team of highly specialised clinical academics and specialist clinicians, many of whom are world-leaders in their field.

“I have been very fortunate to recruit a high quality and passionate teaching team, all of whom are firm advocates of MI Dentistry. Notable clinical academics include Prof Hien Ngo, an MI specialist with international repute as well as other senior lecturers from KCLDI (and myself!),” he said. A number of renowned ‘wet-fingered’ MI practitioners from the UK are also involved, including Dr Louis MacKenzie, Dr Michael Thomas and Dr Bhupinder Dawett, in addition to Len D’Cruz, an expert in MI medico-legal aspects and ethics, amongst others.

AMID key facts:

- Postgraduate MSc qualification for dentists
- Three-year duration
- The mode of delivery is distance learning, which combines online and face-to-face components, enabling practitioners to remain in clinical practice while training.
- Compulsory attendance to two intensive face-to-face courses in year one (5 days) and year two (7 days), in London, UK.
- Participants are assessed through a combination of online assignments, some written examinations, clinical case presentations and a practice-based research dissertation.
- Delivered by an internationally recognised team of teachers in MID
- Course topics include contemporary cariology and disease pathology; detection, diagnosis, risk assessment and care planning for patients; ethics / medico-legal MID risk management; prevention and control management strategies for patient groups and individuals; developing targeted social media / digital marketing strategies to promote your practice and the MI care philosophy to patients; practice and business management skills; minimally invasive tooth preserving aesthetic clinical treatment of patients with caries and other restorative or aesthetic problems, and learning research methodology to enable completion of a useful practice-based research project.





The dentonauts from GC are here to protect ...



Vulnerable immature
teeth need
protection
as soon as possible.

With Fuji Triage™
from GC, you can protect,
even partially erupted teeth.

This section presents abstracts of recently published systematic press releases (<http://www.prweb.com>) on glass ionomer cements. In an effort to appraise the current clinical evidence regarding the merits of using glass ionomers for restorations, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand in South Africa has conducted a series of reviews of randomised control trials and meta-epidemiological studies to draw some interesting conclusions.

Common Longitudinal Studies Are Unsuitable To Guide Clinical Restorative Dentistry

SYSTEM Initiative: New findings show that the results of common longitudinal studies without control treatments are misleading when choosing the correct type of tooth restorations in clinical dental practice.

Clinical longitudinal studies do not include control treatments but only investigate the success and failures of novel tooth restorations over periods of time. The SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has investigated the accuracy of comparison results from longitudinal studies with that from randomised control trials (RCT). RCTs are considered the gold standard in investigating the merits of clinical interventions.

SYSTEM's investigation shows that

comparisons within an RCT indicate the same number of treatment failures of two treatments. In contrast, the comparison between different longitudinal studies erroneously indicates a 64% higher failure rate of one type of treatment above the other.

For this same reason, high-viscosity glass-ionomer restorations have been regarded as clinically inferior to that of silver amalgam in dental practice. When the results of all longitudinal studies, published during the last 10 years, for high-viscosity glass-ionomer restorations were compared with that of amalgam restorations placed in posterior load bearing teeth a largely higher performance for amalgam was found. However, no difference between high-viscosity glass-ionomer and silver amalgam was found in all

randomised control trials, published during the same time period.

Owing to the lack of a randomly selected comparison group, longitudinal studies are vulnerable to many sources of error. These may include misleading factors whose effects may increase with the length of the study period.

SYSTEM's findings suggest that clinical longitudinal studies are unsuitable to guide clinical practice and that clinical decisions should be based on the results of well conducted randomised control trials instead.

The published full reports of the new findings are available online:

- Mickenautsch S, SYSTEM Research note on: How should competing clinical interventions be compared in dentistry? – A simulation-based investigation. J Minim Interv Dent 2013; 6: 73-80.
- And: Mickenautsch S, Yengopal V. Direct contra naïve-indirect

“no difference between high-viscosity glass-ionomer and silver amalgam was found in all randomised control trials, published during the same time period.”

comparison of clinical failure rates between high-viscosity GIC and conventional amalgam restorations. An empirical study. PLOS One 2013; 8: e78397.

No evidence that High-Viscosity Glass-Ionomers are Inferior To Current Gold Standard In Restorative Dentistry

New findings indicate absence of clinical evidence that high-viscosity glass-ionomers are inferior in their failure rate to silver amalgam as current gold standard when placed as load bearing single- or multiple surface cavity restorations in posterior teeth.

In an effort to appraise the current clinical evidence regarding the merits of placing glass-ionomers as tooth restorations, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has conducted a systematic review of randomised control trials and a meta-epidemiological study.

The systematic review included 38 trials, comprising the investigation of more than 10.000 placed tooth restorations. The outcome shows that new generation, high viscous glass-ionomers cannot be regarded as inferior to amalgam, since no overall statistically significant difference was found in the clinical failure

rate between load bearing high-viscosity glass-ionomer and amalgam restorations after follow-up periods ranging from one to six years.

The results of SYSTEM's meta-epidemiological study provide clinical evidence that statements concerning glass-ionomer's inferiority to amalgam and other types of materials are based on incorrect statistical comparison method. Simply put, the traditional argument against the use of glass-ionomers in modern dentistry is based on the wrong assumption that results from unrelated clinical trials with differing clinical settings and patient groups can be directly compared to one another. Instead, statements concerning the merits of clinical interventions should rest on the direct comparison of competing treatment options via randomised control trials.

High-viscosity glass-ionomer restorations do not require provision of macro-retention by high-speed drilling, thus they offer the dental profession

a more patient friendly approach for placing tooth restorations. Placing glass-ionomer restorations also reduces the likelihood of a repeated restoration cycle, because repair of failed restorations does not require the removal of remaining filling material from the tooth cavity.

The published full reports of the new findings are available online:

- Mickenautsch S, Yengopal V. Failure rate of high-viscosity GIC based ART compared to that of conventional amalgam restorations - evidence from a systematic review update. S Afr Dent J 2012; 67: 329-31.
- Text of the full systematic review report:
- And: Mickenautsch S, Yengopal V. Direct contra naïve-indirect comparison of clinical failure rates between high-viscosity GIC and conventional amalgam restorations. An empirical study. PLOS One 2013; 8: e78397.

“Simply put, the traditional argument against the use of glass-ionomers in modern dentistry is based on the wrong assumption that results from unrelated clinical trials with differing clinical settings and patient groups can be directly compared to one another.”

New Evidence Shows No Scientific Difference Between Ruling Fissure Sealant Options and Alternative Materials

New findings indicate absence of clinical evidence that glass-ionomers are inferior in their caries preventive effect to resin composites for the placement of fissure sealants.

Although sealant retention has been shown to be a beneficial factor, among many in caries prevention, professional opinion has championed its unquestioned superiority. This has led to a rejection of alternative sealant approaches.

In an effort to appraise the current clinical evidence regarding the merits of placing glass-ionomers as tooth restorations, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg has conducted a systematic review of clinical trials.

Throughout the systematic review clinical trials were assessed and subsequently accepted or rejected according to criteria related to study validity. All clinical evidence was closely examined and several trials were

excluded on the basis of high bias risk and low precision of results.

The overall outcome offered no evidence that glass-ionomer cements are inferior to the current resin as gold standard when sealing pit and fissure to prevent the development of tooth caries. A subsequent investigation to the original systematic review in 2008 was conducted in 2013 and established that its conclusion remains current.

The new findings suggest that placing glass-ionomer based sealants may offer an alternative in the prevention of tooth caries to placing resin in pits and fissures of permanent teeth.

The published full reports of the new findings are available online:

- Mickenautsch S, Yengopal V. Caries-preventive effect of glass ionomer and resin based fissure sealants on permanent teeth: An update of systematic review evidence. BMC Res Notes 2011; 4: 22.
- And: SYSTEM Initiative/Department of Community Dentistry, Faculty of Health Sciences - 7 York Rd., Parktown/Johannesburg, 2193 - South Africa
Tel +27 11 717 2594
Fax +27 11 717 26252
- Mickenautsch S, Yengopal V. The modified Ottawa method to establish the update need of a systematic review: Glass-ionomer versus resin sealants for caries prevention. J Appl Oral Sci 2013; 21: 482-9.

“The new findings suggest that placing glass-ionomer based sealants may offer an alternative in the prevention of tooth caries to placing resin in pits and fissures of permanent teeth.”

Uncontrolled Clinical Longitudinal Studies Provide Invalid Evidence Concerning Claims That High-Viscosity Glass-Ionomers Are Inferior To Silver Amalgam

Uncontrolled clinical longitudinal studies provide invalid evidence concerning claims that high-viscosity glass-ionomers when placed as load bearing single- or multiple surface restorations in posterior teeth have a higher failure rate than silver amalgam as current gold standard.

When clinical evidence based on uncontrolled longitudinal studies is closely examined, the notion that glass-ionomers are inferior to silver amalgam for load bearing posterior tooth restorations holds little scientific weight. In order to investigate the clinical merits of glass-ionomers, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has established the accuracy of comparison results from longitudinal studies with that from randomised control trials (RCT).

While comparisons within an RCT would indicate that the number of treatment failures between two approaches do not significantly differ,

the comparison of longitudinal study results show a 64% higher failure rate of one type of treatment above the other. Accordingly, expert reviews would mistakenly recommend the merit of placing one type of treatment in favour of the other. The outcome of a systematic review of RCTs by the SYSTEM Initiative found no evidence that new generation, load-bearing high-viscosity glass-ionomers can be proven as clinically inferior to amalgam, since no overall statistically significant difference was found between the both after follow-up periods ranging from one to six years.

In contrast to RCTs, longitudinal studies are vulnerable to many sources of error, owing to the lack of a randomly selected comparison group. These may include misleading factors that may increase with the length of the study period.

SYSTEM's findings suggest that clinical longitudinal studies are unsuitable to guide clinical practice

and that clinical decisions concerning the placement of high-viscosity glass-ionomer tooth restorations should be based on the results of well conducted randomised control trials instead.

The published reports of SYSTEM's findings are available online:

- Mickenautsch S, Yengopal V. Failure rate of high-viscosity GIC based ART compared to that of conventional amalgam restorations - evidence from a systematic review update. S Afr Dent J 2012; 67: 329-31.
- Mickenautsch S, Yengopal V. Direct contra naïve-indirect comparison of clinical failure rates between high-viscosity GIC and conventional amalgam restorations. An empirical study. PLOS One 2013; 8: e78397.
- Mickenautsch S, SYSTEM Research note on: How should competing clinical interventions be compared in dentistry? – A simulation-based investigation. J Minim Interv Dent 2013; 6: 73-80.

“When clinical evidence based on uncontrolled longitudinal studies is closely examined, the notion that glass-ionomers are inferior to silver amalgam for load bearing posterior tooth restorations holds little scientific weight.”

Systematic Review Result Dismisses Fissure Sealant Retention as Valid Measure for Sealant Efficacy

A review of the available clinical evidence indicates that complete retention of sealant material in pits and fissures may be an invalid measure for fissure sealant effectiveness.

The SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has evaluated the validity of loss of complete retention of dental sealants as measure for sealant effectiveness. A three-step approach was followed: Firstly, the rate of sealant retention and the occurrence of caries for the two most common sealant types - resin and glass-ionomer based sealants - were assessed. Secondly, the loss of retention of each sealant type was directly linked to the occurrence of caries on sealed teeth. Finally, the difference between the retention/caries ratios of both sealant types was tested for significance.

The results showed that risk of losing sealant material was significantly associated to caries when resin sealant was used, but not when using glass-

ionomers. The disagreement when using glass-ionomer sealant may be explained by two points: (i) as glass-ionomer sealants fracture cohesively, remnants stay at the base of pits and fissures and may continue to offer caries prevention and (ii) the fluoride from these remnants may effect remineralisation. The ratios of sealant retention to caries for the two sealant types were significantly different and indicate that sealant retention is not independent from the sealant material used. For this reason, sealant retention cannot be regarded as valid measure for general sealant effectiveness.

For daily dental practice this means that the effectiveness of different sealants at preventing caries cannot be determined from their retention rate and thus is not a useful guide for selecting an effective sealant material. Instead, the ratio of caries-free teeth to the total number of sealed teeth after a period of time as direct clinical measure should be used.

The published systematic review is available in full online:

- Mickenautsch S, Yengopal V. Validity of Sealant Retention as Surrogate for Caries Prevention – A Systematic Review. PLOS ONE 2013; 8: e77103

“The results showed that risk of losing sealant material was significantly associated to caries when resin sealant was used, but not when using glass-ionomers.”

No Evidence That Silver Amalgam Is Superior To High-Viscosity Glass Ionomer When Placing Posterior Tooth Restorations

SYSTEM Initiative: New findings suggest no valid evidence that placing silver amalgam restorations is clinically superior to placing high-viscosity glass-ionomer restorations in load bearing posterior cavities of permanent teeth.

In an effort to appraise the current clinical evidence, the SYSTEM Initiative of the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, has conducted a systematic review of randomised control trials and a meta-epidemiological study to this topic.

In total, 38 controlled clinical trials were accepted as evidence, comprising the investigation of more than 10 000 placed tooth restorations. The outcome shows that amalgam cannot be regarded as superior to new generation, high viscous glass-ionomers fillings, due to a lack of clinically meaningful differences in both restoration types' failure rates beyond the play of chance.

The results of SYSTEM's meta-

epidemiological study shows that statements concerning amalgam's superiority are based on incorrect statistical comparison methods. Such methods continue to include and rely on the common naïve-indirect comparison of restoration failure rates from uncontrolled clinical longitudinal studies.

High-viscosity glass-ionomer restorations do not require provision of macro-retention by high-speed drilling, thus they offer the dental profession a more patient friendly approach for placing tooth restorations. Placing glass-ionomer restorations also reduces the likelihood of a repeated restoration cycle, because repair of failed restorations does not require the removal of remaining filling material from the tooth cavity.

The new findings suggest no valid evidence that placing silver amalgam restorations is clinically superior to placing high-viscosity glass-ionomer restorations in load bearing posterior cavities of permanent teeth.

The published full reports of the findings are available online:

- Mickenautsch S, Yengopal V. Failure rate of high-viscosity GIC based ART compared to that of conventional amalgam restorations - evidence from a systematic review update. S Afr Dent J 2012; 67: 329-31.
- Text of the full systematic review report:
- And: Mickenautsch S, Yengopal V. Direct contra naïve-indirect comparison of clinical failure rates between high-viscosity GIC and conventional amalgam restorations. An empirical study. PLOS One 2013; 8: e78397.

“The new findings suggest no valid evidence that placing silver amalgam restorations is clinically superior to placing high-viscosity glass-ionomer restorations in load bearing posterior cavities of permanent teeth.”

Step by step:

Restoring with G-ænial Bond

Self-etching with G-ænial Bond



1 Apply G-ænial Bond



2 Wait for 10 sec.



3 Dry with minimum air pressure 5 sec.



4 Light-cure for 10 sec.

Selective etching G-ænial Bond



1 Etch the enamel for 10 sec.



2 Rinse



3 Dry



4 Apply G-ænial Bond and continue as described on the left hand side

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1 material - 2 choices for perfect bonding.



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G-ænial Bond offers you a **very high and safe adhesion to both enamel and dentine**, regardless of the technique you choose. With G-ænial Bond you gain the **simpli-city** and **reduced post-operative sensitivity** of a self-etch adhesive combined with increased bond strength when you decide to use 10-second selective etching on enamel. And thanks to the combination of chemical and mechanical adhesion as well as a the HEMA-free formulation, your restorations will benefit from **long-lasting bond strength and excellent marginal integrity** in time.

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GC



Cementation of hybrid abutments with G-CEM LinkAce

Roland Verhoeven

GC G-CEM LinkAce is a dual-cure self-adhesive universal resin cement, designed for the adhesive luting of all-ceramic, metal or composite indirect restorations. Its features and properties make it a good option for the cementation of hybrid abutments on the laboratory side.

The hybrid abutment

Ceramic abutments have been developed as an alternative to overcome the optical problem of the grey discolouration caused by titanium (Ti) abutments. Despite the good aesthetic properties of ceramic abutments, concerns remain regarding their mechanical resistance. On the other hand, hybrid abutments are fast becoming a popular choice for implant placement due to their aesthetic benefits. Typically the hybrid abutments consist of a titanium base with a ceramic abutment on top, made from zirconia or lithium disilicate, etc.

These two-piece hybrid abutments

combine the benefits of strength from titanium and aesthetics from the ceramics. Thanks to the hybrid abutment a seamless transition is achieved because the shade of the zirconia/ lithium-disilicate hybrid abutment is a better match to that of the final crown. The result is a more natural-looking outcome that eliminates the unattractive 'show-through' often seen when traditional titanium or standard, unshaded zirconia/ lithium disilicate abutments are used.

Studies have shown that hybrid abutments tend to demonstrate sound



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Step by step: cementation of hybrid abutment

Fig 1-2-3: Hold the Ti abutment and check the fit of the Zr abutment. Color spray can be used. We do recommend GC Fit Checker™ Advanced Blue which is simpler to handle and delivers higher precision on the visualization of pressure spots. If necessary, adjust the fit by grinding the inner part of the Zr abutment.

Fig 4: Block the screw channel and protect the margins with wax. Only the bonding surface should be exposed.

Fig 5: Sandblast the bonding surface of the Ti abutment with 50 µm Al₂O₃ and maximum 2 bars maintaining around 1 cm distance from the abutment.

Fig 6 : Protect the margins of the Zr abutment with wax.

Fig 7: Sandblast the bonding surface (inner part) of the Zr abutment using the same parameters.

Fig 8: Place the Ti abutment in the implant replica and protect the margins with wax.

Fig 9: For the cementation, we recommend G-CEM LinkAce, shade AO3 (opaque). Always check the opening of the tube before attaching the mixing tip. Bleed a small amount of the pastes to level them if needed.



clinical performance. Carvalho et al. evaluated the stress distribution of different abutments, namely titanium, zirconia and hybrid of titanium and zirconia. According to their study, recently published, in the Journal of Prosthetic Dentistry, "For anterior implant-supported restorations, regardless of the platform connection, a zirconia abutment attached to a titanium base (hybrid abutment) or a titanium abutment provides better mechanical behaviour than pure zirconia abutments."(1) Considering that both titanium and hybrid abutments present similar mechanical behavior, the latter would be preferred as it adds up on aesthetic properties.

Superior cementation

The best abutments need a high quality cement. Offering the highest

polymerisation in self-cure mode, G-CEM LinkAce ensures perfect results, even in cases where the transmission of light cannot be assured. Moreover, the peculiar phosphate monomers of G-CEM LinkAce guarantee an unsurpassed bond strength and durability to both titanium and zirconia, without the need of pre-treatment with primers.

G-CEM LinkAce is delivered in a double barrel automix syringe which facilitates the handling with minimal waste and is considered to be the perfect alternative for cementation of hybrid abutments and two-piece implant systems. G-CEM LinkAce is available in 4 different shades: Translucent, A2, AO3 & BO1. For hybrid abutment cementation, we recommend the opaque shade AO3 to better mask the dark shade of the Ti base.

Its features and benefits include:

- Highly effective self-cure mode for better properties even when light can not reach the cement line
- Safe and durable bond to titanium, zirconia & lithium disilicate
- Film thickness of only 3 µm for perfect fit
- Easy handling and ready-to-use (no refrigeration needed)

Highly efficient self-cure mode

In many clinical situations, light simply cannot pass through indirect restorations. Specially in cases of hybrid abutments, which are fabricated using

The result is a more natural-looking outcome that eliminates the unattractive show-through often seen when traditional titanium or standard, unshaded zirconia/ lithium disilicate abutments are used.

Fig 10-11: Using the automix tip, extrude the cement around the upper circumference of the Ti abutment. The cement will slowly flow down. This will help to avoid bubbles in the cement line. Important: always discard the very first paste extruded from the mixing tip as it may not present an ideal proportioning of pastes A and B.

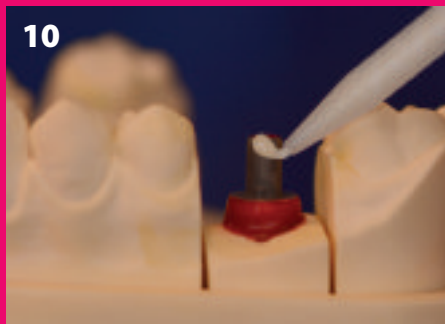


Fig 12: Place the Zr abutment in position. The working time of the cement is 2'45" from start of mixing. Do not allow any movement of the Zr abutment.



Fig 13: Light cure each side for 20 seconds with a Halogen/ LED lamp with minimum of 700 mW/cm² (wavelength between 430 and 480 nm).



Fig 14: Remove excesses. Alternatively, this can be done before light curing. For that, wait until the cement reaches a rubbery consistency to remove excesses.



Fig 15: Hybrid abutment after cementation.



Fig 16-17-18: Polish the margins with a polishing rubber and Gradia Diapolisher.





Fig 19: Replace the hybrid abutment on the implant analog.

Fig 20-21: Proceed with the preparation of the crown. For the cementation of the crown on the hybrid abutment, we also recommend G-CEM LinkAce.

low translucency zirconia. The setting of the cement relies purely on its self-cure mode. Light intensity reduces drastically through many restorative materials. Whenever light transmission can not be assured, an efficient self-cure polymerisation is essential for the clinical success of the restoration.

G-CEM LinkAce, a product of extensive R&D by GC, offers a highly efficient initiator system for rapid and safe polymerisation.

Reference

1. Carvalho MA, Sotto-Maior BS, Del Bel Cury AA, Pessanha Henriques GE. Effect of platform connection and abutment material on stress distribution in single anterior implant-supported restorations: A nonlinear 3-dimensional finite element analysis. J Prosthet Dent. 2014 May 12. pii: S0022-3913(14)00192-9. doi: 10.1016/j.prosdent.2014.03.015. [Epub ahead of print]



About the author

Roland Verhoeven graduated from the IVT Nieuwegein, Dental Technic in 1995. Between 2000 & 2006 he

worked for GC EUROPE as a Technical & Training Manager for dental technician products. In 2006 Roland opened his private dental lab "VND dental" providing dentists with cosmetic & functional custom made dental restorations made of ceramics, gold and zirconium. Besides his occupation in his private dental lab Roland is also a freelance trainer for GC EUROPE and covers Initial courses upon request.

Inside GC

As a global organisation, GC is committed to achieving excellence in all areas of business. It does this by continually measuring its activities against international industry benchmarks and has been awarded numerous accolades to date. The graphic below provides some insight into the continuous cycle of excellence at GC.



GC is the global market leader for dental materials and also the world's largest provider of expertise, advancements, product quality and top customer service in the fields of composites, ceramic layering and adhesive systems.

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G-ænial from GC



At GC, we focus on individuality. We understand that no two patients are the same – and neither are their restorative challenges. We also understand no two dentists have exactly the same preference when it comes to placement technique or ideal composite restorative.

To meet this need GC presents a range of composites with **handling options** from firm and packable through to flowing and injectable. Each GC composite introduces **aesthetic qualities** which help clinicians create **invisible restorations** with simplicity and efficiency. Each of these composites offers **superior physical properties** and polish retention to ensure strength and **durable aesthetics**. And each product showcases the innovation and quality that is core to GC's product philosophy.

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