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2020



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Dear readers

Welcome to the 15th edition of GC's Get Connected newsletter.

In the past years, there has been an increased focus on individualized healthcare. This concept is becoming more and more relevant in dentistry as well. It is evident that this kind of need-based approach requires a high level of experience and thorough clinical knowledge as well as proven procedures and guidelines. In search of the optimal treatment plans we closely collaborate with renowned experts in the field to identify and extract the newest trends and best concepts in dentistry, of which we again show some nice examples in this issue. You will find beautiful cases with our top aesthetic composite Essentia, a single shade case as well as a multi-layering approach on opposite sides of the spectrum. Moreover, you will find some interesting interviews with opinion leaders on the rise of Molar Incisor Hypomineralisation in children as well as on the ongoing trend of digitalization in the practice.

One of GC's basic ideas for the year 2020 is "Stimulate your curiosity": we hope that these cases may inspire you in your daily practice.

Enjoy reading and feel free to contact us in case you have any questions or comments.

Dr. André Rumpthorst

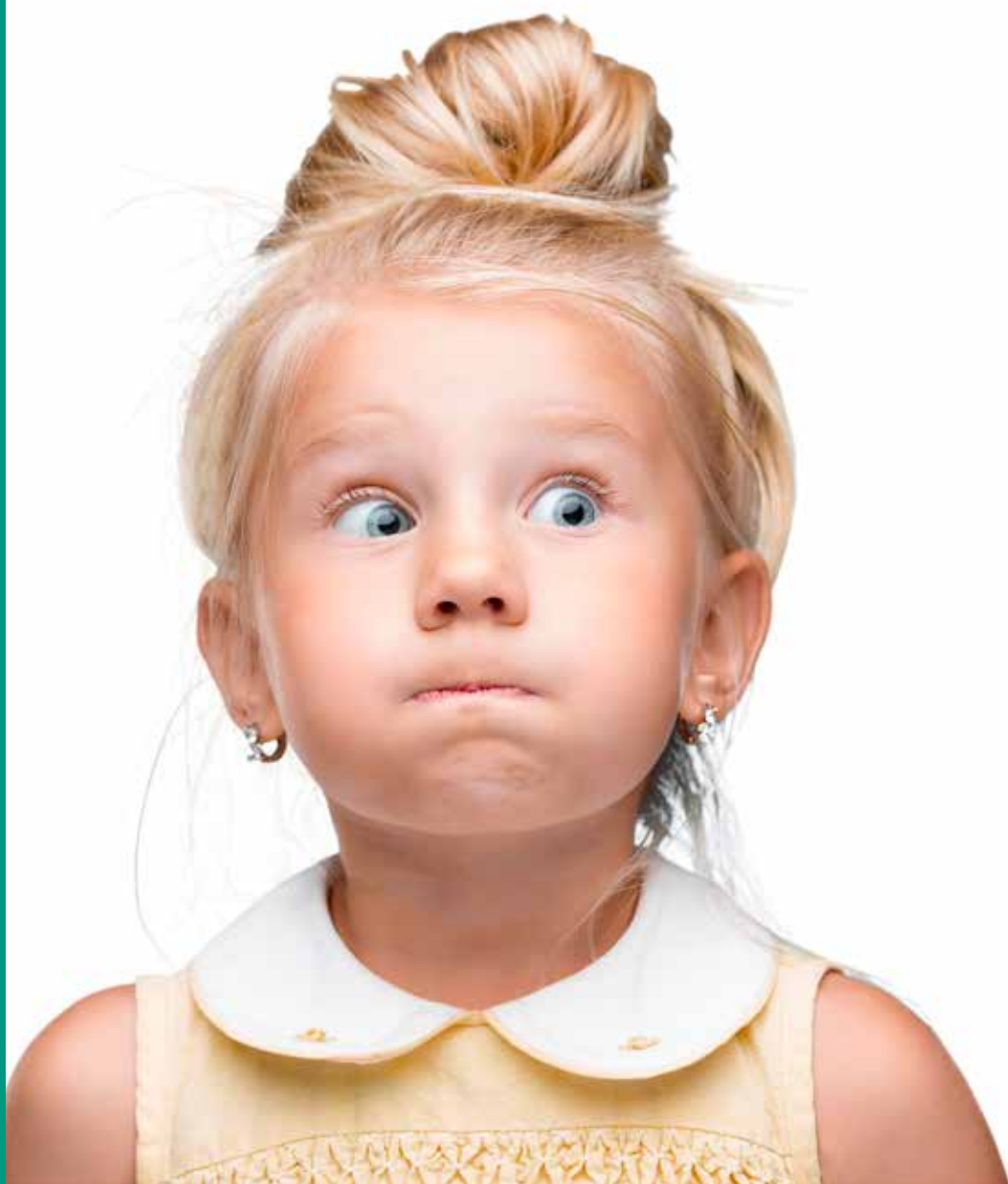
General Manager Marketing & Product Management
GC Europe NV

Challenges and treatment of the different levels of MIH

Interview with Dr. Nina Zeitler, Germany



Dr. Nina Zeitler studied dentistry at the University of Erlangen-Nuremberg (Germany) from 1996 to 2003. In 2005 she completed the implantology curriculum from eazf and in 2006 the curriculum for pediatric and adolescent dentistry from eazf/APW. In 2006 she started in a group practice. In 2016 she completed a Master's degree in Pediatrics and Adolescent Dentistry and in 2017 a Master's degree in Orthodontics. She has had her own practice since 2016: Seasmile - the dental practice for kids & teens.



How do you currently diagnose molar incisional hypomineralisation (MIH) in your practice? What are typical features of MIH?

Dr. Nina Zeitler: It is currently a purely clinical diagnosis. For us, practically, MIH is divided into:

- a mild form: a sharply defined opaque-whitish to brownish colour change,
- a medium form: colour change with minor breakdown,
- the severe forms: with strong and dark colour changes and some accompanied by massive loss of hard substance (post-eruptive breakdown). Sometimes these teeth are no longer present.

The severity of MIH is not always congruent with the symptoms described by the patient. We have e.g. patients with slight colour changes yet severe hypersensitivity and vice versa.

What do you attach particular importance to in diagnosis and therapy, what is important to consider?

Dr. Nina Zeitler: The most important thing for us is to recognise MIH as early as possible and to make patients and parents aware of this problem. We have developed a concept that rests on two pillars: Prophylaxis (at home and in practice) and therapy. At the same time, it must be made

clear to patients and parents that the MIH requires all three parties (patient-parent-dentist) to work together. Prophylaxis sessions at the dentist alone are not enough. However, it helps the parents a lot if we relieve them from their helplessness and feelings of guilt and provide them with tools with which they can improve the situation. Here I am thinking of tooth protection creams without acidic fluoride. The patients receive the most intensive training in oral hygiene and nutrition. The prophylaxis session in the practice also requires special empathy, techniques and materials. From a therapeutic point of view, you always have to consider how far the tooth has already erupted and if it can be kept dry for repair. There may also have to be a sedation or general anaesthesia option, because these teeth can react extremely sensitively despite local anaesthesia.

Which forms of therapy do you currently use and which ones are successful?

Dr. Nina Zeitler: If the MIH tooth shows no breakdown, we place a sealing and fluoride with MI Varnish. With a complete breakthrough and a good possibility to isolate from moisture, a resin sealing with a 5th generation bonding agent is placed. Very sensitive and / or partially erupted teeth are sealed with e.g. GC Fuji Triage®. The latter leads to an immediate reduction of a possible hypersensitivity. In the event of partially erupted tooth, but with the breakdown of the tooth surface, we place a filling until the tooth is "big enough" to place a glass ionomer (GI)



Mild MIH



Moderate MIH



Severe MIH with posteruptive breakdown



Incisors with MIH

or composite filling. We observe hypersensitivities with composite fillings, not with GI.

However, GI should be used with a little caution: the "newer" GI (and glass hybrid, GH) have sufficient hardness for a filling with a good prognosis; the "old" GI usually start to fail after just one year. The manufacturers state for which filling areas and for which tooth types the respective GI is approved. If the defect is already large and the filling requirements no longer exist, we use preshaped crowns in metal or ceramic. Of course, an individual crown, e.g. made with injection moulding technique, is also possible.

Crowns of any kind, especially when cemented, instantly decrease pain symptoms. Sometimes one tooth or even several teeth cannot be saved, then we start a close cooperation with orthodontics and oral surgery. Are wisdom teeth in place and are they growing promisingly? Orthodontic or prosthetic gap closure? When should e.g. the first molar be removed so that the second molar adjusts itself as well as possible? Or does the first molar have to go and we plan a prosthetic solution? If so, when and which ones? Individual planning must be done here!



Sealed tooth with MIH

How often does MIH occur compared to early childhood caries (ECC)?

Dr. Nina Zeitler: We see almost twice as much MIH as ECC. The ECC appears to be stagnating in quantity, whereas the MIH seems to be spreading. The latter means that we see the MIH not only on the permanent central incisors and first molars, but also on the permanent canines and second premolars and on the deciduous second molars. Its severity also appears to be increasing.



Hypomineralisation of a premolar



Hypomineralisation of the second primary molar

How often do you recall the patients (and their parents)?

Dr. Nina Zeitler: Children and adolescents who have an MIH are followed up at least every 3 months. We do not differentiate whether hypersensitivities already exist or not. Our creed is here: Defy the beginning! If we see an MIH without hypersensitivity and without (posteruptive) breakdown, the patient must practise improved oral hygiene at home as well as take part in special prophylaxis sessions in the practice. In worse cases, i.e. when there are complaints and / or major collapses, the frequency is sometimes even monthly; usually the prophylaxis sessions alone are no longer sufficient.

Which recommendations do you have for your colleagues?

Dr. Nina Zeitler: MIH is THE dental problem of today's children and adolescents - you are more likely to encounter a child with MIH than one with caries!

We strongly recommend dealing with this phenomenon and establishing a prophylaxis and treatment concept.

Inferior diastema closure with a universal composite



Ormir Bushati was born in 1987 in Shkodër (Albania). He obtained his Master's degree in Dentistry in 2011 at Tirana University (Albania). He followed a one-year postgraduate Theoretical-Practical-Clinical course in Orthodontics "Straight Wire Technique Evolved Philosophy" (2015-2016), a one-year postgraduate in implantology and several trainings all over the world. He is an author of several articles in national and international journals and winner of several "best cases" contests. He lectures and trains on focus topics in restorative dentistry. He runs his own private practice in Shkodër, focused more in restorative and aesthetic dentistry.

Diastema closure is a common request in the dental office. When an orthodontic approach is not desirable, the diastema can be closed by means of restorative treatment. With a direct approach, the spaces are closed in a minimally invasive, cost-effective way.

By Ormir Bushati, Albania

A patient consulted the dental office for her lower incisors with multiple diastemas and black triangles. We noticed asymmetric teeth, with disproportional width and length, whose shapes could be improved

while closing the diastema (Fig. 1).

It was decided to close the spaces minimal invasively, with a direct composite technique.

Essentia Universal (GC) was selected because of its medium translucency



Fig. 1: Initial situation with diastema between the lower incisors.

Inferior diastema closure with a universal composite



Fig. 2: Teeth were thoroughly cleaned and air polished until the disclosing agent did not show any visible staining

and adequate shade, and because it is easy to manipulate.

Prior to the treatment, the teeth were cleaned. The biofilm was marked with a disclosing agent and the teeth were air polished until there was no visible staining left (Fig. 2).

A very tight isolation was made with a heavy rubber dam and transparent matrices (Biomatrix) were adjusted for lower incisors. Sufficiently deep placement and good adaptation of the matrix was assured by correct placement of the rubber dam with sufficient retraction and contact with

the adjacent matrix (Fig. 3).

With the matrices in place, teeth were etched, rinsed and dried carefully (Fig. 4). After the bonding application, a tiny amount of Essentia Universal HiFlo was placed first and a small amount of preheated composite was applied (Essentia Universal).



Fig. 3: A clear matrix was used. Care was taken that the matrix was placed sufficiently deep and showed good adaptation

Everything was condensed to avoid any air bubbles and then polymerized. To have a tight approximal contact and closure of the black triangles, the gingival portion only was applied and polymerized first. Then, a wedge was placed and the remaining part was completed (Fig. 5). The same procedure was repeated on the other teeth and some composite was



Fig. 4: A total etch bonding protocol was applied



Fig. 5: After closure of the central diastema with Essentia Universal composite



Fig. 6: The procedure was repeated to close all diastema



Fig. 7: Palatal side after treatment



Fig. 8: Result after 28 days



Fig. 9: Result after 42 days, intraoral view. The black spaces are completely closed

placed to veneer the buccal aspect as well (Fig. 6).

After finishing and polishing the restoration, the adaptation at the palatal side was verified (Fig. 7).

At follow-up after 28 days (Fig. 8) and 42 days (Figs. 9-11), a very good integration of the composite restoration, with symmetric closure of the diastema and black triangles, was confirmed.



Fig. 10: Oblique view after 42 days



Fig. 11: Result after 42 days, extraoral view.

A non-invasive treatment approach with direct composite veneers

A 28-year-old female patient and 4th year dental student came to the dental clinic of the Master's degree in aesthetic restorative dentistry and endodontics in the King Juan Carlos University in Madrid. She was unhappy with the looks of her central incisors, which were restored after a trauma that she suffered years ago and now the old restorations looked aged and unaesthetically.



Andrés Silva completed his Master's degree in aesthetic restorative dentistry and endodontics in King Juan Carlos University of Madrid, Spain in 2019. He won the prize in the 2018 International Festival of Aesthetic Dentistry (Festetica 2018) and the first place in the senior category of the 2019 Essentia Academic Contest. He currently works in his family owned practice in his hometown in Valencia, Spain.

By **Andrés Silva**, Spain

The original restorations had a shape in accordance to the size and shape of her teeth, but were darkened and too translucent, exposing the fracture line (Figure 1). Even after orthodontic treatment and two orthognathic surgeries, the patient still had severe midline deviation to the right side and mandibular asymmetry. There were diastemas present were the maxillary segmentation had been done (between teeth 1.2–1.3 and 2.2–2.3) (Figure 2 and 3).

The patient was looking for the most conservative option, so we offered composite veneers as a minimally invasive choice in which no healthy tooth structure has to be removed.



A non-invasive treatment approach with direct composite veneers



restorations. We made the shade selection using the button technique. The chosen composite was Essentia (GC) and the masses were Light Enamel (LE) and Light Dentin (LD) for the incisors and Universal Shade (U) for the right canine (Figure 6 and 7).

On the day of the restorations, local anaesthetic articaine 40 mg/ml+0.005mg/ml (Ultracain, Normon) was placed. Complete isolation was achieved with rubber dam using the floss tie technique to adapt the dam to the cervical area of each tooth (Figure 8).

Resin composites can achieve excellent aesthetics¹ and with an overall survival rate higher than 88% up to 10 years, they are an optimum choice.²

On a close-up picture the shape of her teeth looks round and acceptable, but in the facial analysis, the smile line is inverted, and the central incisors don't stand out much. We wanted to create more harmonious teeth proportions that would also fill her smile. To plan this, we made a direct restorative trial adding composite to her teeth without bonding to see live what bigger teeth would look like and if the patient liked it. As everyone liked the plan, we took impressions with the trial still in place and poured type IV stone to make the study models.

Using digital photography and analysis, a 2D digital smile design (DSD) was done (Figure 4). This information was then transferred to the dental cast to

make a 3D plan. On the next appointment, a silicon key was made to copy the wax-up and then transfer into the patient's mouth with a bis-acrylic resin for temporary teeth (Figure 5).³

The patient was thrilled with the new look of her smile, so we proceeded to plan the appointment for the

Rubber dam isolation helps achieve optimal gingival retraction that is superior to that obtained by using the cord retraction technique, obtaining field and moisture control and better access to create proper contact.

Once the isolation is placed, it is important to check the fit of the silicon key and make any necessary



A non-invasive treatment approach with direct composite veneers

cut backs with a scalpel blade to ensure it is possible to fit it into place on top of the rubber dam (Figure 9).

To remove the old restorations without damaging the teeth, the old composites were outlined using a round, steel bur on a low-speed handpiece to delimit the margin between teeth and resin (Figures 10 and 11). The restorations could then be safely removed using a combination of high-speed, low speed and a number 12 scalpel blade for the remnants (Figure 12).

We started with the central incisors as these teeth had the same fracture pattern and thus the restorations would be similarly made, and it is easier to manage just two teeth at a time rather than five. Adhesion was achieved by a selective etching of enamel using 37% orthophosphoric acid for 20 seconds, then rinsed and air dried. Two layers of G-Premio BOND (GC) universal adhesive were

placed, and the solvent was evaporated with air before light curing (Figure 13).

Using the silicon key, the palatal shell was made with Essentia LE. The two palatal shells were secured with a small amount of Light Dentin to prevent their breakage (Figure 14). Then, equal amounts of dentin mass were applied and the mamelons were shaped (Figure 15). At this point, we could see that there was an area of darkened tooth dentine that was not completely disguised with the dentine mass, so a small amount of Masking Liner (ML) was applied to cover it.

A layer of Opalescent Modifier was placed in between the mamelons and in the space between the mamelons and the incisal edge to recreate the opalescent halo. This is a great composite to recreate the natural opalescent effect of anterior teeth. It has similar opalescent characteristics as enamel, so depending on the

incidence of the light and the background behind the teeth, it may give either a bluish or orangish opalescent halo. This is much better than using stains that will give just one colour to the restoration.⁴

A last layer of enamel composite was added and moulded with a brush (Gradia Brush nº 1 flat, GC). A good tip is to impregnate the bristles with a modelling liquid (Modelling Liquid, GC) and then remove the excess with a cotton gauze, to prevent the composite from sticking to the instrument and make handling easier. A quick contouring was done with Sof-Lex discs (3M Oral Care) before moving on with the laterals and canine.

The same adhesive technique was performed on the lateral and canine teeth. Stratification was done on the laterals using Light Dentin and Light Enamel with Opalescent Modifier for the opalescent halo. A single mass of Universal Shade was used on mesial of the canine (Figure 16).

In order to close the interdental spaces and contour the emergence profile, a Mylar strip was placed interproximally and then a top layer of enamel placed. The strip was then pulled in a palatal





direction while at the same time adapting the strip to the cervical area of the teeth. This was done in order to transfer the original anatomy of the teeth to the restoration and make more personalized teeth instead of using a preformed posterior matrix in a vertical direction, which would give a standardised profile to all cases.

Guidelines were drawn to mark the place for the transition lines, contouring was performed with Sof-Lex discs (3M Oral Care), and mamelons were shaped using a round stainless steel bur on a low-speed handpiece (Figure 17). Polishing was done by completing the Sof-Lex sequence and finishing with polishing paste on a felt buff wheel (Figure 18 and 19).

A one-week control was done to check the colour and integration of the restorations after rehydration had

occurred (Figure 20). It was also a good time to check for absence of inflammation of the gums. If there were any, it would have been a good chance to review hygiene instructions or if caused by excess of material, to re-polish margins were needed.

The three months control confirmed the colour stability of the composite, the short time survival without any incidences and the gloss retention (Figure 21 and 22). We were very satisfied with the result.

In conclusion, direct composite veneers are a great, conservative and versatile treatment that can achieve great aesthetics and bring satisfaction to our patients. Essentia by GC follows a simple shade matching protocol to simplify the technique and the amount of shades needed to obtain excellent aesthetics.

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The digital workflow in present-day orthodontics

Interview with **Dr. Med. Dent.**
Marc Geserick, Germany



Dr. Med. Dent. Marc Geserick, LL.M. (MedR) obtained his dental degree in 2000 at Dental College Universität Ulm (Germany). In 2004, he finished his training in orthodontics at the University of Basel (Switzerland). Since 2005, he has his own private practice in Ulm. In 2007-2008, he was a visiting professor at the University of Iasi (Romania). From 2013 to 2015 he followed the postgraduate study Master of Laws in Dresden (Germany). He stayed abroad at various universities in Sri Lanka, Japan and California. He is actively participating in continuous education and received the Bioesthetic Level I-II and finished a 2-year Roth/Williams postgraduate. He has also been involved in the development of the Bite Jumping Screw (Forestadent).

The use of intraoral scanners is becoming more common in orthodontics. However, the integration or full transition from a conventional to a digital workflow can be difficult for some dentists. We spoke to Dr. Med. Dent. Marc Geserick to understand how he is using the Aadvia Intra Oral Scanner (IOS) 100 Orthodontics workflow in his daily work.

Hello Dr. Geserick, you are in the profession now for about 20 years. For how long have you been working with a digital workflow?

In 2011, the whole practice stepped into the digital workflow and since then we have already done over 4000 cases. Initially, we started with the Lythos Scanner (Ormco) and currently we also have the option to work with the portable 3Shape Scanner with a partner office. But the Aadvia IOS 100 in the developed Workflow outperforms both systems. Since 2018, we have been using the Aadvia IOS 100 and have already scanned over 500 cases.

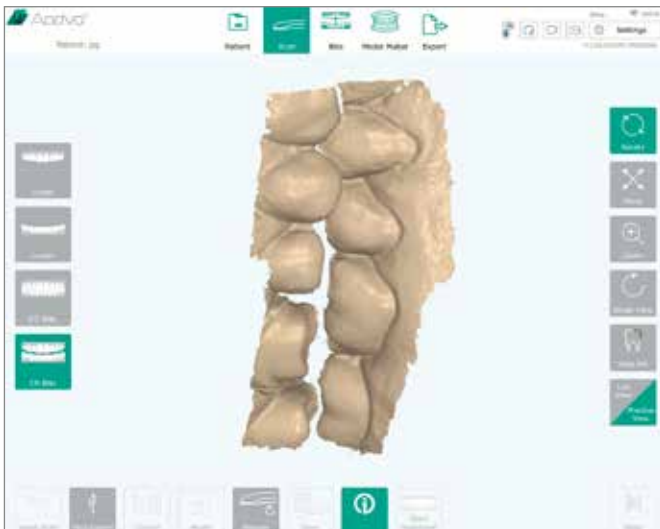
How do you rate the extensive ortho workflow in the Aadva IOS 100? Do you see it as an added value?



Distance Indicators: Left - Too far (Large Red Square); Center - Ideal Distance (Green); Right - Too Close (Small Red Square)

I consider the Ortho workflow in the Aadva IOS 100 to be very versatile. Scanning the upper or lower jaw has become very easy with the distance indicators seen on the screen (red for close/far and green for ideal distance). The CR and CO bites can be scanned in a few seconds by scanning

either the left or right side. Also, the Intelliscan feature facilitates the scan on soft tissues and makes the scan pick-up a lot easier. We scan with few interruptions and high precision, making the planning of cases a lot easier.



View of the Bite Scan

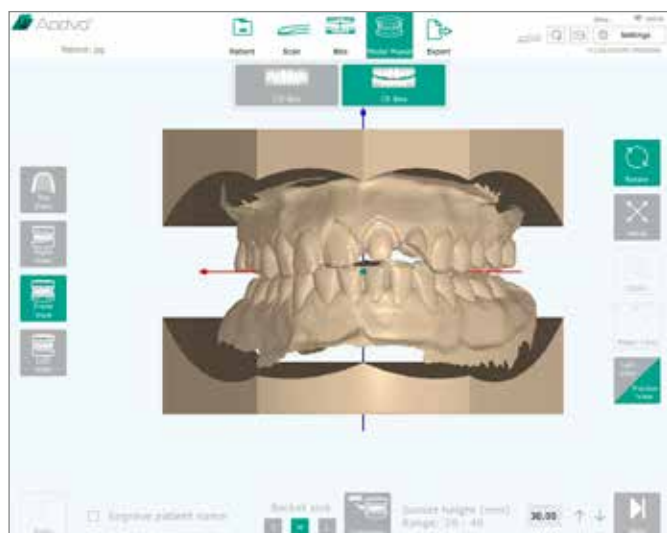


Scan done with the Intelliscan feature for soft tissue scanning

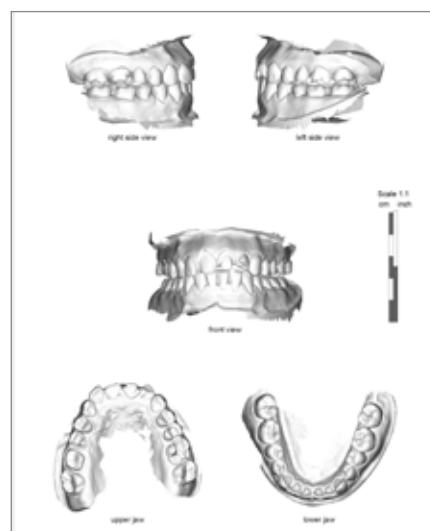
The software allows me to effectively plan my cases thanks to the different tools it offers throughout the process. After performing the upper, lower and bite scans, the software combines them to create a virtual model providing me a complete view of the mouth. In the virtual model created by the Model Maker feature we are able to see the jaws

using different view options and adjust them to make sure that everything is aligned and centered. Additionally, before finalizing, we are able to download and print a PDF document with the images of the model, giving me the necessary tools to plan my cases.

The digital workflow in present-day orthodontics



Model Maker with hollow American cut for optimal 3D printing



PDF document for treatment planning

How has the Aadvia IOS 100 benefited your daily workflow compared to your conventional workflow?

The Aadvia IOS 100 has allowed me to enjoy a greater work-life balance. I could reduce my work week to less than 4 days, allowing me to spend more time with my family. We don't have to store gypsum models (with a few exceptions) and our administrative workload is reduced because when we do *in vivo scans*, we now have different options to share the cases with the lab. Also, we can keep the patient's information synchronized with our Patient management software.

With the Aadvia IOS 100, I am able to scan a full arch in less than 3 minutes. But the combination of features I found in it are what attracted me the most. As mentioned before, I have worked with the IOS 100 since 2018 and have already scanned over 500 patients, scanning an average of 10 patients per day. I see Aadvia IOS 100 as a reliable entry-level scanner with an attractive price tag.

From which features of the Aadvia IOS 100 did you benefit the most? How and why?

The overall performance of the newly created workflow gives us a great support in the daily clinical routine. The biggest benefit is the pdf creator in case of the treatment planning and marketing.

Doing Model Analysis and creating tooth motion planning has become very simple with this feature.

Do you like the handpiece?

The Aadvia IOS 100 has one of the lightest and smallest handpieces on the market, which makes it easy to use. However, in some cases, we have noticed that the head of

the handpiece is a bit thick for patients with small mouths (such as children). To work-around this we are able to combine the conventional impressions with the *in vivo* bite scan.



Ergonomic and lightweight Aadvia IOS 100 handpiece for easy handling



Can you tell us more about this particular process, combining the impressions with the in vivo scan?

We begin by taking a conventional impression with alginate and we scan the impression along with the intra-oral bite of the patient. This is a time-saver because

we don't have to make a gypsum model and we proceed a lot faster in the planning phase where there is a limited access to the patient's mouth.

How do you store the scan files and patient data?

We are a "gypsum-free" practice and we can save our scan files on a USB stick, our network or the Aadva Xchange cloud service. The scans that are stored in the Aadva Xchange cloud can be stored for an unlimited duration

and we can extract the data wherever, however and whenever we want. This allows my lab to access the cases without inconveniences and maintain a fluent communication between both parties.



Aadva Xchange (screen view)

What other digital solutions are you using in your daily practice?

3D Model Printing. Manufacturing of ortho devices are outsourced to an external aligner company and digital ortho labs.

Dr. Geserick, thank you very much for this interview!



IOS 100 P

Besides the IOS 100, GC Europe also offers a portable version called the IOS 100 P. The IOS 100 P has the exact same features as the IOS 100, but consists of a laptop and the Aadva Intraoral Scanner 100 handpiece. This option provides high flexibility to dentists who work at multiple locations as it can easily be transported between offices. Additionally, GC is continually enhancing the software used with the intraoral scanner to keep ensuring that the customer experiences a smooth workflow.

Injection Moulding: Case study & technique guide

By Dr. Anthony Tay, Singapore



Dr Anthony Tay received his Bachelor of Dental Science from the University of Melbourne, Australia, in 2005. He returned to Singapore in 2006, where he has been involved in full time metropolitan private practices. He is the clinical director of his clinic, The Dental Gallery Pte Ltd. As a general practitioner, he delivers a comprehensive range of dental services, with special interest in composite rehabilitation, restorative dentistry and minimal intervention dentistry. He is the President of the Aesthetic Dentistry Society Singapore, as well as the past vice-president of the Academy of Cosmetic Dentistry (Singapore). In addition, Dr Tay is actively involved in continuing dental education for his peers. He has published in various media, including *Dentaltown* and *Dental Asia* magazines. Dr Tay regularly conducts workshops and gives lectures on the topic of composite in Singapore and overseas. He is a current trainer and Key Opinion Leader with GC.

A smile makeover is an aesthetically driven dental procedure which aims to rejuvenate a smile and potentially create a life-changing result. It requires a deep knowledge on smile design, an eye for detail and art form, and the clinical hand precision to create the unique, perfect smile.

The treatment planning generally adopts a team approach, involving the patient, clinician, auxiliary staff and the technician. Communication between patient, clinician and technician is paramount to the success of the smile makeover. While more costly porcelain veneers remain the mainstay in this treatment modality, composite veneers have always been an economical alternative. The treatment plan can similarly begin from a wax-up fabricated by the technician, before emulating the design in the patient's mouth, via a freehand

approach. The difficulty lies in accurately transferring the exact prototype tooth form and shape into the final delivery, and this skill can take years to master.

With the development of composite filler technology, we are excited to share a predictable smile makeover workflow involving the latest G-ænial™ Universal Injectable composite, perfectly complemented by EXACLEAR™ transparent PVS material. The technique involves replicating the exact smile design template from a wax-up using

EXACLEAR™ PVS material, preparing the teeth, and restoring the surfaces with G-ænial™ Universal Injectable composite, utilising the injection moulding technique. Interproximal finishing is carried out before finishing and polishing is completed on the labial veneer surfaces. This methodical approach is simple to follow and

shortens the learning curve of smile makeovers with composite veneers. It is especially useful for cases with ideal alignment, such as postorthodontic shade and surface rejuvenation.

In this clinical case, the female patient presented with failing, thin composite veneers that were carried out after

her orthodontic treatment was completed. She was also dissatisfied with the proportion, size and shade of individual teeth. A thorough discussion was held and the patient preferred a more conservative option of composite veneers from teeth 14 to 24, in particular using the injection approach.

Clinical tips

1. The EXACLEAR PVS material has the ideal set consistency for direct vent hole creation, using the sharp tip of the G-ænial Universal Injectable metal syringe tip. It is important to remove any excess EXACLEAR material from the syringe tip to prevent accidental extrusion and embedment into the actual composite surface.
2. Depending on the technique preferred, one or two vent holes can be utilised. If using two vent holes for the anterior, the holes are situated one on the mesial and one on the distal. This technique eliminates air trapping and reduces the amount of excess.
3. When taking the impression, take care not to press too hard on the silicone, so that all incisal edges are covered with a sufficiently thick layer. This is for the stability of the stent and to avoid potential tearing or deformation of the key.
4. For maximum strength, the injectable composite should be bonded entirely on enamel, with no more than 0.5mm of unsupported composite. This will reduce the risk of chipping.
5. The silicone key should always extend far enough to include at least two teeth distally from the teeth to be treated on both sides. This ensures stability of the key when it is positioned in the mouth and ideal reproduction of aesthetic detail for a more predictable outcome.
6. During the injection, a little bit of overflow is needed to ensure that all small voids at the margins and interproximal spaces are filled.
7. The high transparency of EXACLEAR allows effective light-curing through the clear stent leading to a higher conversion rate. It eliminates the air inhibition layer for easier and faster polishing.
8. For excess removal, a blade #12, finishing strips and discs are useful.
9. A dental mouthguard is recommended and prescribed for nightly wear to prevent premature composite chipping, especially for patients who grind their teeth.

Clinical Case



Fig. 1: Young female patient concerned by failing composite veneers with shade and proportion-mismatch. The patient chose to have composite veneers for teeth 14 to 24.



Fig. 2: 3D printed resin model, from a digital wax-up on 3Shape Dental System*, based on her intraoral scan.



Fig. 3: EXACLEAR™ clear PVS material syringed onto a non-perforated mandibular tray to capture an accurate impression of the printed resin model.

Injection Moulding: Case study and technique guide



Fig. 4: Highly accurate information of the digital wax-up recorded in the EXACLEAR™ stent.



Fig. 5: Alternate tooth preparation technique employed, involving teeth 14, 12, 21 and 23 initially. Retraction cords placement done.



Fig. 6: Selective enamel etch, one tooth at a time, with isolation using Teflon (PTFE) tape to protect the adjacent teeth.



Fig. 7: G-Premio BOND applied to the etched surface.



Fig. 8: Margin of the preparation is wetted with an injectable composite, G-ænial Universal Injectables shade BW.



Fig. 9: Create a vent hole in the EXACLEAR™ stent with the tip of the G-ænial™ Universal Injectables composite and carry them together into the mouth.



Fig. 10: Injection moulding with G-ænial Universal Injectables BW, beginning with a position close to the margin, before withdrawing incisally through the vent hole.



Fig. 11: The high transparency of EXACLEAR™ allows effective light-curing through the clear stent leading to a higher conversion rate. Light-curing is done and injection moulding completed for the first tooth 12.



Fig. 12: EXACLEAR™ stent is removed, to allow removal of gross excess.



Fig. 13: Interdental strip refinement.



Fig. 14: Polishing disc with wedging to allow better access beyond the line angles.



Fig. 15: Gross finishing completed for the first 4 teeth. The same steps are employed for teeth 13, 11, 22, and 24.



Fig. 16: Gross removal of excess is carried out, followed by finishing and polishing for all the teeth involved. Cervical finishing is achieved with a high-speed needle-shaped fine tip diamond bur.



Fig. 17: Polishing with EVE DiaComp Twist* pink and grey polisher on a contra-angled slow handpiece.



Fig. 18: Cotton buff on a contra-angled slow handpiece for high shine and lustre.



Fig. 19: Immediate post-operative view, awaiting gingiva rebound and recovery.



Fig. 20: 5-week post-operative review with final shape refinement, finishing and polishing. Patient is extremely satisfied with the result.

Technique

- Teeth were scanned intra-orally with a digital scanner, and the file was imported into the 3Shape Dental System*, where a digital waxup was performed to improve the size and shape of the teeth concerned.
- A 3D model was printed based on the digital wax-up.
- EXACLEAR clear PVS was used for the impression of the printed model, using a non-perforated tray for transparency and ease of removal.
- The clear stent was removed and trimmed for intra-oral placement.
- The teeth were prepared using a separate PVS buccal matrix or putty key as a guide. This was utilised to optimise ideal preparation and prevent under or over-reduction of the teeth.
- Retraction cords were placed and a supragingival veneer reduction on the buccal surfaces was completed, with a 0.5 mm thickness for the composite veneers.
- An individual vent hole was created on the EXACLEAR stent from an inciso-labial angle.
- Adopting a tooth-by-tooth approach, each tooth was isolated with Teflon (PTFE) tape, before selective enamel etch was carried out.
- G-Premio BOND was applied to the surface for effective adhesion. An alternate tooth technique was employed to keep the composite within the designated tooth space and prevent excess from bonding interproximally.
- G-ænial Universal Injectable shade BW was first used to wet the margins of the preparations, to minimise air void formation.
- G-ænial Universal Injectable BW was used for the main shade of the veneers to block out any remaining chromatic discrepancy between the teeth.
- The EXACLEAR stent with the G-ænial Universal Injectable syringe and tip were carried together and fitted over the designated teeth.
- Injection moulding was carried out with the light-curing completed through the EXACLEAR™ stent.
- The EXACLEAR stent was removed to allow gross excess removal and provisional finishing.
- The injection moulding step was then carried out for the other teeth similarly.
- Interdental and buccal finishing and polishing ensued.
- Patient was reviewed after 5 weeks for minor shape correction and final polishing.
- The final result shows beautiful surface lustre that is close to porcelain, and the patient was overjoyed with this predictable smile makeover.

GC Temp PRINT

- a versatile material



RDT Stephen Lusty qualified in Cape Town, South Africa. Since 2008 he has run his laboratory in Cornwall, UK, specializing in aesthetic dentistry. His passion for the 'art of dentistry' is what drives him to continue to strive for perfection. In a normal day, Stephen works closely with his clients, seeing patients for custom shade matching and finishing.

Having been fortunate enough to have trialed GC Temp PRINT prior to the launch at IDS this year I have had a lot of time to evaluate and develop my own methods of working with this material. In the following text I aim to share some of these experiences.

By **RDT Stephen Lusty**, United Kingdom

Temp PRINT is - as it says in the instructions - a temporary material for any type of temporary restoration with maximum one pontic. This material first appealed to me as a way of reducing the amount of acrylic units that I would need to mill, thus freeing up time in my milling machine to mill zirconia. It does not replace every type of temporary restoration as longer span bridges are still better off being milled or made using a substructure and traditional techniques. This material has lived up in every way to my expectations and I now use it for the vast majority of the temporary crowns that I produce, however this is not all that I use it for.

It occurred to me that as a material that is approved for use in the mouth and with the shade being based on tooth shades it is a great material for trial smiles, checking occlusion on larger cases, as well as mimicking stump shades for all-ceramic work.

Temp PRINT is probably the easiest material to print and finish with a very smooth surface by comparison to some other printing materials. It is incredibly rare to get a misprint using this material.



Temporary Restorations



Fig. 1-2-3: With a growing number of clients sending their work through various scanner portals, it is becoming increasingly important to work in a digital environment for planning and executing cases, Temp PRINT has proven to be the missing link in this digital chain. I can now create a digital diagnostic, which can be manipulated to become the temporary restoration and then finally the final restoration in a completely controlled manner keeping consistency and therefore living up to patients' expectations. The case is designed in the dental design software (in this case Exocad).



Fig. 4-5-6: The crowns are nested and ready for printing, each material requires a different amount of light intensity, support size and separation force. The properties of Temp PRINT make it incredibly easy to print and leave a perfect smooth finish. After printing, the crowns are cleaned in isopropyl alcohol and a final cure is performed in the Labolight DUO.



Fig. 7-8-9: I always post cure with the supports on. The material finishes better after post curing and I stand them on the supports to post cure, giving the light full access to the restoration. The fit directly after curing is absolute perfection, which is why I prefer working with printable temporary materials over milled materials. The properties of Temp PRINT make it incredibly easy to print and leave a perfect smooth finish.



Fig. 10-11-12: I now control the shape and emergence profile manually, at the end of the day I am still a dental technician and prefer to give all cases the personal touch. The case is finished being contoured and the emergence is checked, if any addition is necessary I would do this now using GRADIA PLUS. These temporary restorations are now ready for fitting and are a great way of assessing the final shape and shade for the long term restorations. If all goes well, the same file can be used and manipulated to create the final restorations.

Stump Shades

Although the majority of my temporary restorations are now made using this material, this is not the most common use of Temp PRINT in my lab. I use far more of this material to aid with shade assessment by creating natural colour dies.



Fig. 13-14-15: When I am producing all ceramic work from intra oral scans that will have a degree of translucency, I print two dies to work on, one in regular model material and another in GC Temp PRINT. This die is then shaded using OPTIGLAZE color to the same shade as the remaining stump in the patient's mouth. This die is used for colour assessment, whilst the model material die is used to check the fit. The Temp PRINT die is in fact accurate enough to check fit, however by adding a layer of OPTIGLAZE I am adjusting the fit surface slightly. I therefore prefer the security of having a second die to double check the fit of the restoration. The final shades are balanced and controlled through the knowledge of what is lying underneath the restorations.

Function

Fig. 16: I also use this material to help asses bites and form on larger cases prior to committing to a finish, in these cases it is not necessary to use OPTIGLAZE color as the function is what we are assessing. The single crowns can be temporarily bonded onto the framework and then once assessed and adjusted if necessary can be rescanned back into the software for further processing prior to finalising.



In conclusion, GC Temp PRINT has been one of the most exciting additions to the material portfolio in my lab due to its versatility and ease of use, and I now have more time available in my milling machine to allow it to be more productive with the milling of final pieces of work.





Santiago García Zurdo was born in Madrid (Spain) in 1974. He completed his studies as dental technician in Opesa (Madrid) in 1992. With more than 20 years of experience in different laboratories, he opened his own dental laboratory in Madrid in 2012, focusing his work on dental aesthetics. He obtained the certificate of the Osaka Ceramic Training Center (Osaka, Japan) under the orders of Shigeo Kataoka in 2012. Santiago has been working in Germany (Bellmann-Hannker Dentallabor) in 2014. In 2016, he started implementing the eLAB protocol of Sascha Hein and became an eLAB instructor in 2018. He currently practices in a specialised private practice in Madrid (Spain).



Juan Zufía González DDS obtained his dental degree at the Universidad Complutense de Madrid (Spain) in 2001. He is an Associate Professor of the Master in Surgery, Periodontology and Implantology in Alfonso X El Sabio University and Director of the CEI Institute of Dental Implantology in Madrid. His private practice in Madrid is dedicated to General Dentistry, Aesthetics, Periodontology and Oral Surgery and Rehabilitation. He is the author of several publications.

Creating veneers with the platinum foil technique

Today, the treatment with veneers has become one of the star treatments from a non-invasive point of view. This article describes the platinum foil technique for the manufacturing of ceramic veneers, also sometimes referred to as "contact lenses". It is an entirely manual method of manufacturing, with a long history, even dating back to the beginning of the 20th century.

By **Santiago García Zurdo** and **Juan Zufía González DDS, Spain**

This manufacturing by hand in the platinum foil technique is in contrast to the rapid development of CAD/CAM technologies and established methods such as the refractory stump or injected ceramic technique.

Nevertheless, the platinum foil technique is increasingly popular today because it has many indisputable advantages: the speed of manufacturing and personalization in layering, as well as the great aesthetic property of this type of restoration. Due to the minimum preparation of the natural tooth, the light is freely transmitted and restorations blend in better compared to restorations that require more preparation space.



In the following case, the manufacturing of 6 veneers to close small spaces or diastemas, hardly requiring preparation, has been described step by step. At all times, an alveolar model is used in order to preserve all gingival information.

As a first step in aesthetic treatments we always create an additive wax-up on the initial study model, in order to obtain a global vision of our objective and check the aesthetic requirements. Once the respective mock-up has been tested in the mouth and its aesthetic result has been verified, the clinician can begin to make the minimum preparations necessary for future restorations.

After the clinician has taken the impression, the alveolar work model can be prepared. The platinum foil has to be adapted to each die with the help of a Bunsen burner, taking special care and reheating the foil once it has been adapted to eliminate all possible remnants of grease.



Fig. 1: Study model of the initial situation.



Fig. 2: Additive wax-up.



Fig. 3: Initial situation prior to preparation.



Fig. 4: Intraoral mock-up.



Fig. 5: Verifying the smile line.



Fig. 6: Verification of the minimum preparation space with a preparation guide, based on the wax-up.



Fig. 7: Detail of the preparation margins.

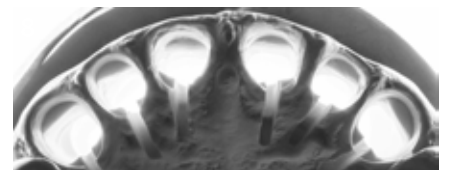


Fig. 8: Alveolar model preparation.



Fig. 9: Intraoral view after preparation.



Fig. 10: The platinum foil adapted onto the alveolar model.

Creating veneers with the platinum foil technique

A first thin layer of dentine is applied for the first bake, it is important to verify whether or not the substrate of our preparation is favourable in terms of colour. With minimum thicknesses, hovering between 0.3 and 0.5 mm, less leeway is left to mask a possible unfavourable substrate, but in case of a favourable substrate, it poses and advantage in terms of optical properties.

After the first bake, dentine structure is modelled. Initial LiSi ceramics possesses properties that enable the simulation of optical effects that give the restorations a very natural look.

Next step would be to replace the enamel in the restorations; the Initial LiSi range comprises enamel powders with great opalescence. The last phase of resurfacing and texturing, as well as the mechanical polishing require special care.

Once the veneers have obtained their final glaze, the platinum foils are submerged in cold water to reduce the surface tension and finally separated.

It is often assumed that the marginal adjustment of veneers made with the platinum foil technique is suboptimal. However, this reputation is not entirely justified; in many cases, this adaptation is even better than with a direct or injected veneer.



Fig. 11: First thin ceramic preparation layer.



Fig. 12: Internal structure of dentine.



Fig. 13: Internal effects.



Fig. 14: Result after bake.



Fig. 15: Next enamel firing.



Fig. 16-17: The finished veneers on a work model.



Fig. 18: Ultrathin veneers, often referred to as "contact lenses"



Fig. 19: Cementation under rubber dam.



Fig. 20.21-22-23-24-25-26: Final view after veneer placement, as seen from different angles.

The challenge of replacing adjacent incisors

By Dr. Cyril Gaillard, France



Dr. Cyril Gaillard graduated from the University of Bordeaux II in 1998, followed by numerous post-graduate training in aesthetic, implant and prosthetic rehabilitation in Europe, Canada and the USA. He is also the Founder and President of Global Advanced Dentistry (www.gad-center.com). He has authored numerous articles and lectures about aesthetics, full mouth rehabilitation, implants and function. He has a private practice at Bordeaux in implantology and aesthetic dentistry.
www.gad-center.com

Replacing missing adjacent maxillary incisors is a very challenging procedure since aesthetic play a crucial role in this area. Gingival tissue preservation is a major factor, especially in young patients, where the maxillary lip line is usually higher and the gingiva is more apparent. Achieving an excellent papilla between the adjacent missing teeth when using implants is not easy. In addition, achieving ideal gingival margin levels may be a problem as well, depending upon the amount of bone loss that occurred when the teeth were lost.

Case report

A 26-year old female patient visited the clinic because she was dissatisfied with the tooth-supported PFM-bridge in the maxillary zone. The narrow space between the two abutment teeth was closed by one pontic causing an apparent asymmetry in the smile (Figs. 1-3).



Fig. 1: Preoperative extraoral view.



Fig. 2: Preoperative intraoral view.



Fig. 3: Preoperative view from the top.

After clinical and radiographic assessment, the digital smile design was created. Two treatment options were evaluated, keeping in mind the minimum distance between two adjacent implant shoulders to preserve the crestal bone in between (Figs. 4-5):

- 1) Replacing the three-unit bridge by a four-unit bridge on two implants
 - With this option, it was not possible to obtain a good ratio of the crowns.
- 2) Replacing the three-unit bridge by two single restorations of the central incisors with reshaping of the canines and premolars.
 - This option gave the best crown ratios to achieve a harmonious result.



Fig. 4: Digital smile design (DSD) of two treatment options.

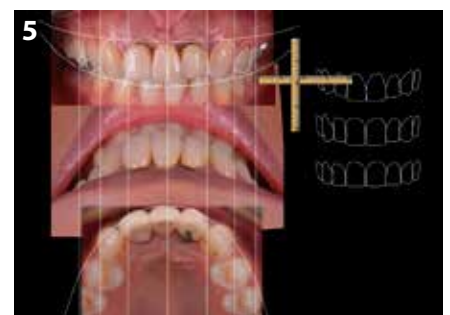


Fig. 5: Final DSD with frontal, top and occlusal view.

The challenge of replacing adjacent incisors



Fig. 6: Wax-up, frontal view.



Fig. 7: Wax-up, side view.



The second treatment option evaluated with the digital smile design served as a base for the wax-up (Figs. 6-8). The maxillary incisors were abraded and the shape of both canines and first premolars was altered to achieve a symmetrical design while respecting the tooth ratios. The design was evaluated together with the patient by means of an intraoral mock-up (Figs. 9-11).



Fig. 8: Wax-up, occlusal view.



Fig. 10: Preparation of intraoral mock-up using a silicone key.



Fig. 9: Intraoral view after removal of the deprecated PFM restoration.



Fig. 11: Intraoral mock-up.



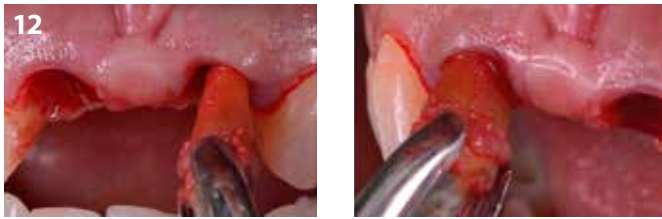


Fig. 12: Atraumatic removal of the radices.

The roots were extracted atraumatically under local anaesthesia (Fig 12). A crestal incision was made that was located slightly more towards palatal (Fig. 13)

Space was created up to the appropriate depth i.e. 12 mm with the pilot drill (Fig. 14). Proper alignment of the implant space was checked with regard to the adjacent and opposing teeth. The socket was then prepared by a sequence of drills with gradually increasing diameter, never exceeding 50 Ncm torque. An Standard Aadvia implant, regular, 4 mm diameter, GC Tech, Breckerfeld, Germany was placed at a speed of 25 rpm in accordance with the manufacturer's instructions (Figs. 15-16) and the primary stability was checked.

A subepithelial connective tissue graft was augmented to achieve an inter-implant papilla (Fig. 17). Two healing screws were placed (Fig. 18).



Fig. 17: Soft tissue Graft to increase the papilla between the central incisors.



Fig. 13: Supracrestal incision, slightly towards the palatal side.



Fig. 14: Pilot drill.

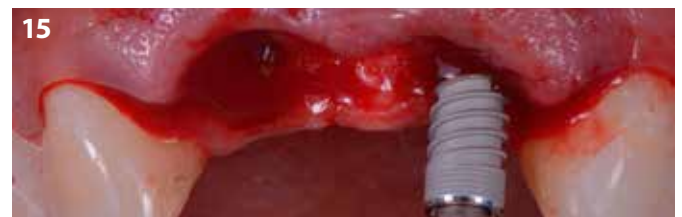


Fig. 15: Implant placement.



Fig. 16: Occlusal view on the implants after placement.



Fig. 18: After placement of the healing screws.

The challenge of replacing adjacent incisors

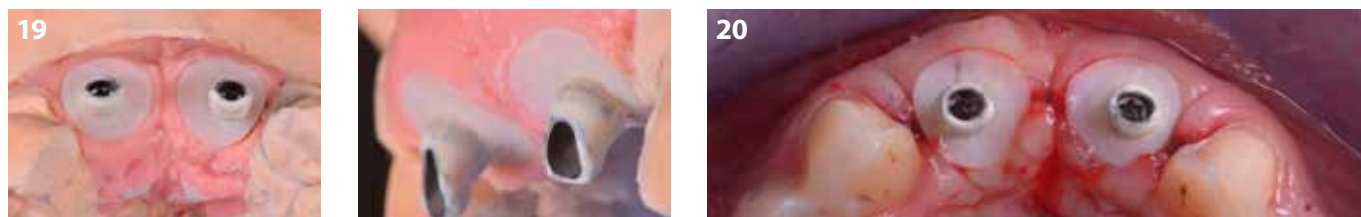


Fig. 19-20: Creation of the temporary abutments with a natural emergence profile to support the gingiva.

Temporary customised abutments and acrylic provisionals were prepared in the lab (Figs. 19-20). Care was taken to prepare a subgingival emergency profile that gave a smooth transition from the implant platform to a natural tooth shape at the gingival level, supporting and shaping the gingiva around the implant (Figs. 21-23).

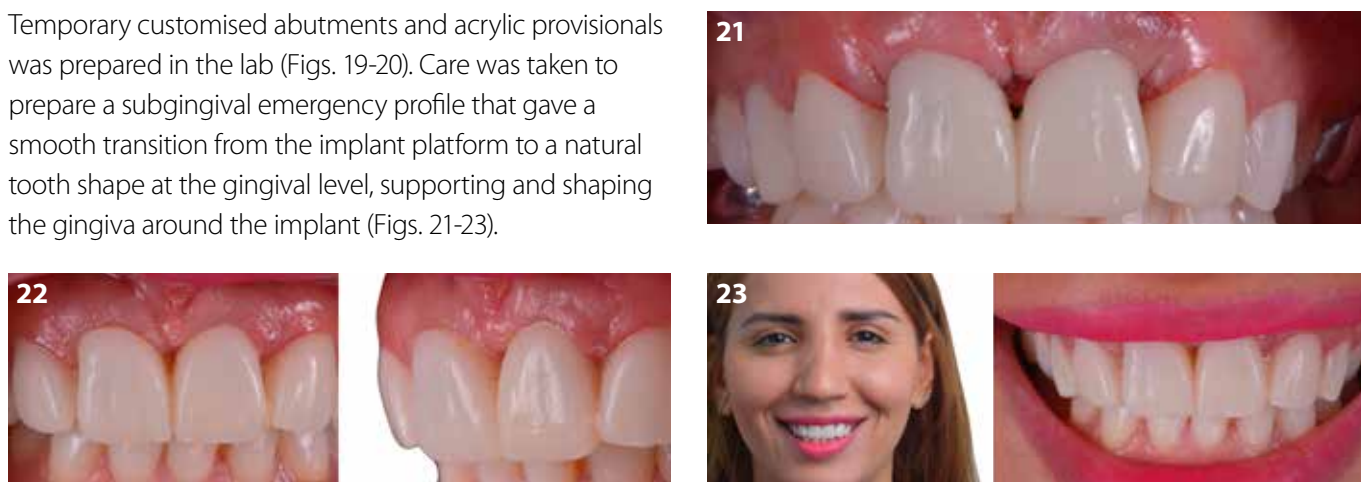


Fig. 21-23: Temporary restorations screwed onto the implants.

After a period of 6 months, soft tissues were healed and adapting to the provisional crowns (Figs. 24-26).



Fig. 24: View on the temporary abutment after a healing period of 6 months.



Fig. 25-26: After removal of the temporary abutments. The gingival tissue is shaped.



Fig. 27: Impression on implant level (pick-up technique).

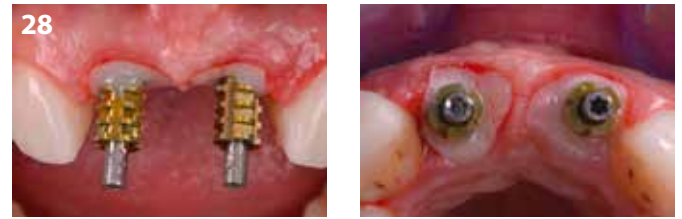


Fig. 28: customisation of impression copings to copy the emergency profile.

An impression post was individualised with acrylic resin to copy the emergency profile shaped in the period of temporisation and the final impression was made with a pick-up technique (Figs. 27-28).



Fig. 29: GC Hybrid abutments (Zr suprastructure on Ti base).



Fig. 30: Frontal view before inserting the custom abutments.

Two customised CAD-CAM abutments (GC Tech Milling Centre, Leuven Belgium) from a zirconia suprastructure on a titanium base (GC Hybrid Abutment, GC Tech) were prepared and screwed onto the implants with 20 Ncm torque (Figs. 29-32). The ceramic crowns were then cemented onto the abutments (Figs. 33-34). The final result showed a symmetric smile with preservation of the papillae between both implants and between the implants and adjacent teeth.



Fig. 31: The custom Zr abutments were screwed on the implant.



Fig. 32: The custom Zr abutments after proper seating.



Fig. 33-34: Final result.

Conclusion

Implant placement is restoratively driven, but the surgical step is key in determining the aesthetic potential. Understanding the biological concepts and maintaining a strict surgical and prosthetic protocol are therefore crucial.

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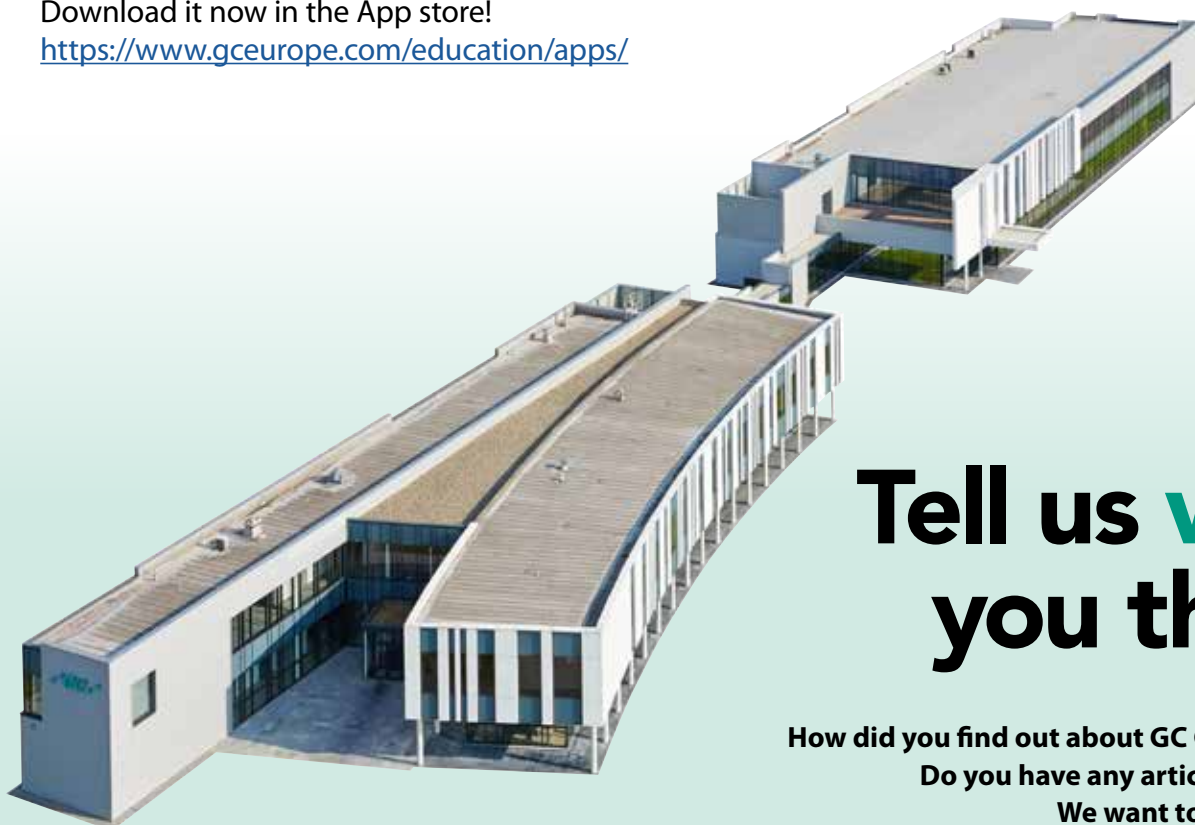
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