Do something fantastic this Autumn!

Philip Lewis looks forward to the 8th ESCD Annual Meeting

Which of the following is true for you?

- I'd like to be more successful
- I'd like to really enjoy attending postgraduate education
- I love to travel and appreciate a little pampering
- I like to take my team with me to postgraduate events so that they come back as motivated as I am
- I don't like spending an arm and a leg!

If you answered ‘yes’ to even one of these questions the ESCD Annual Meeting is for you!

ESCD?

Who?
The European Society of Cosmetic Dentistry is a truly international association with members throughout Europe and beyond.

It's not a faceless society, you probably know a number of its leading members already as they're household names in the UK as well! ESCD is different. It's a Society that welcomes the whole dental team. Its meetings attract truly world-class speakers but there's a friendliness and intimacy about it rarely equalled elsewhere.

The 2011 Meeting will be held in the picturesque medieval city of Dubrovnik on the shores of the Mediterranean on September 30th and October 1st. 'Little Summer' as it's known in the area. A time when days are still warm, the sea still inviting and the town quiet after most of the summer visitors have returned home. Sounds good? That's only the start! Have a look at the program:

Keynote speakers include Professor Dr Nasser Barghi from San Antonio USA speaking on bonded all-ceramic restorations.

A true legend of operative dentistry, not everyone has had the privilege of attending Dr Barghi's lectures as they are usually over-subscribed and rarely presented on this side of the Atlantic. Be amazed about what is possible in modern dentistry and be inspired as Dr Barghi explains how many of his apparently complex techniques are easily accessible for all practitioners.

Many UK practitioners are familiar with Drs Tif Qureshi, James Russel and Lennart Jacobson through the innovative and practice-changing Inman Aligner. In this lecture they will be explaining and introducing the concepts of the most popular modern approach to dentistry among both clinicians and patients; minimal intervention.

One of the UK's leading innovators is joined one of the nation's top dental technicians in this presentation on Internet Marketing; probably the most pertinent method for practice expansion of the decade.

Dr Bob Khanna

Most of us associate Bob with the development of facial aesthetic techniques in the UK; overlooking the fact that he is also an accomplished aesthetic dentist. This is a rare opportunity to see this personable and approachable clinician lecture and meet him in the informal atmosphere of the ESCD social events.

That's just a few. There are many others; Wolfgang Richter, President of ESCD and expert in composite bonding, Martin Jorgens and Marcel Wainwright whose experience in lasers and other advanced techniques has to be seen to be believed. Noam Tamir from Smile-On as well as other eminent speakers. Professors, clinicians and experts from around Europe. The ever-popular clinical tips session; lectures and workshops and of course, social events.

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These are challenging times in dentistry. The sort of education provided by ESCD can transform practices; new techniques, new treatments, new ideas. You’ll learn things that can help put you on the leading edge of the profession. You’ll be able to offer things other practices simply can’t offer. How’s that for a competitive advantage?

It gets better. The philosophy of ESCD is to make top-class dental education affordable for everyone. Fees for both membership and events are kept to a minimum. You don’t even have to be a member to enjoy the meeting but you get a great discount if you join.

With budget airlines offering inexpensive flights to Dubrovnik from airports across the UK it’s an opportunity not to be missed. Then there’s the networking. You’ll meet leading clinicians from across Europe. The discussions you have with colleagues outside the lecture halls can have as much influence on your future success as the lectures themselves.

Great education, fun social events, a superb location and unequalled camaraderie. All this at a fantastic price.

Some colleagues may be worried about attending an event in a foreign country. They may be concerned there’ll be nobody there they know. Don’t be! I’ll be there and I’ll be happy to arrange a little get-together for UK delegates the night before the Conference. Just email me if you want more information.

The official language of ESCD is English so don’t worry about not being able to understand lectures given by European colleagues.

As you might have guessed by now, I’m a great supporter of ESCD. I’ve been attending their events for years. As a member, I’ve been enjoying all the membership benefits and calling upon the advice and expertise of the directorship which has really helped me develop my practice. Why don’t you do the same?

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Posterior restorations can be easily and durably built up directly using composite without having to dispense with the reconstruction of an anatomical surface and, consequently, physio-logical function.

Though resin-based composites have been used for the restoration of posterior teeth for decades, they were often subject to compromises. Increased patient demands for natural restorations combined with the public debate regarding amalgam and the associated health risks as well as the aim of dentists to treat patients as minimally invasive as possible have greatly accelerated the development of composites in the past ten years. As a result, composites have become an indispensable material in conservative dentistry both in the anterior and posterior regions.

The possibilities for tooth conservation have been greatly extended in the literal sense of conservation with the establishment of minimally invasive adhesive techniques and can no longer be compared with the preparation forms of the amalgam era. In the past components used is just as diverse as the number of composites available. Each of these components influences the handling properties and clinical behaviour.

These different material classes also allow direct composite restorations to be used successfully in the masticatory loadbearing posterior region. However, there were problems in the posterior region that were attributed to the use of composite materials in both clinical studies and as a result of practical experience. The problems were mainly in the form of increased central and lateral occlusal abrasions, marginal gap formations, dis-coloration of the margins and restoration material, marked polymerisation shrinkage and associated stresses as well as postoperative sensitivity. For these reasons the development companies increased research into solutions to minimise or even eliminate these problems.

This aim was achieved with the introduction of a new material class of aesthetic composite materials that also incorporate excellent physical properties. These composites contain new filler particles and were modified in the composite base. They also exhibit improved adaptation, enhanced viscosity and natural shade behaviour.

The filler particles were also placed in the nano range, a spectrum which is used to describe functional materials and structures in the range between 0.1 nm and 100 nm, and distributed homogeneously in the base. These nanofiller composites are a new, separate category of composite materials and are available both as universal composites and as special composites, such as flowables.

Composites modified using nanotechnology provide various advantages compared with conventional universal composites. These include reduced shrinkage and shrinkage stresses, improved mechanical properties and natural optical behaviour. In vitro studies also verify that the abrasion resistance of nanocomposites is comparable or even superior to that of microfiller or microhybrid composites.

The mechanical and physical parameters do not play a significant role for patients. When patients decide to have an adhesive composite restoration, they assume they will receive a

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**Venus Diamond: The diamond class of nanocomposites**

Aesthetics play a major role in dentistry. Today it is no longer enough if the anterior region appears aesthetic. Aesthetics in the posterior region are now considered just as important as in the anterior region and in addition to function, durability and stability this is one of the basic criteria that a restoration must fulfil.

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**‘Composites have become an indispensable material in conservative dentistry both in the anterior and posterior regions’**
durable, first-class restoration. Patients focus on the visual outcome. The shape and shade of the restoration must adapt perfectly to the surrounding tooth structure. The final perceptible shade effect, however, depends on a large number of factors, which a modern composite material must fulfill.

The shade perceived by the eye is a subjective sensation and comprises a variety of individual physical aspects. The main physical aspects are hue, intensity, and brightness. Factors such as reflection, refraction, translucency, and fluorescence are also important with regard to the appearance of a finished restoration.

The colour perception of the human eye is influenced by the power spectrum of the light which falls on the retina, whereby this light not only originates from the object observed but also from the surrounding area in particular. The phenomenon of metamerism can, however, lead to problems in conservative dentistry: materials can appear to be the same colour or differently coloured depending on the type of lighting. This means that the natural tooth and filling material could appear to match perfectly in certain surroundings but not in other surroundings.

It is therefore important when selecting a material, to choose a composite with physical properties that allow it to adapt to the surrounding tooth structure. The size of the filler particles and the quantity ratio between fillers and matrix play a fundamental role in this case.

Venus Diamond is a special methacrylate monomer-based composite produced using nanotechnology. An optimised filler system with fillers in the nano range and a new designed matrix determine and optimise both the mechanical-physical and optical properties. The nano-particles are distributed uniformly in the organic matrix due to the use of non-agglomerated silicon oxide nanofillers. In addition, the free nanoparticles, there are larger fillers made from barium aluminium fluoride glass in the matrix. The band width of the filler particle sizes is therefore between 5nm and 20µm. This allows the total filler content to be increased to 64 per cent by volume (82 per cent by mass). Optimisation of the particle size and the more homogeneous distribution of the particles in the Venus.

Fig.5: Application of the etch-and-rinse one-bottle adhesive iBOND Total Etch on the enamel and dentine and polymerisation.

NEW

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Diamond nano-hybrid composite not only increase the packing density of the fillers but also reduce the volumetric shrinkage, increase the strength and abrasion resistance and enhance the translucency of the material. The new matrix system in combination with the nanofillers results in reduced shrinkage of approximately 1.5 per cent by volume and shrinkage stress of approximately 2.8 MPa.

The mechanical properties of nanofiller-hybrid composites are superior to those of pure hybrid materials and the handling and clinical advantages also outweigh those of pure hybrid materials. The good polishability and durable stability of the polished surface, is a result of the optimised filler system of the composite.

Venus Diamond: The shade concept
A special shade concept was developed for Venus Diamond to meet the requirements of all clinical situations both in the multiple build-up technique and the monochromatic technique. This concept subdivides the shade system into the three levels of translucency of opaque, universal and incisal, which are matched to the Vita shade system and correspond to a respective translucency of 50 per cent, 51 per cent and 55 per cent.

The aesthetic shade concept is simple and logically structured so that the most attractive high-end restorations as well as efficient restorations, adapted to the shade of the tooth, can be fabricated.

The shade adaptation to the surrounding tooth structure is promoted by the optical effect of the nanoparticles. The shade adaptation to the surrounding tooth structure is promoted by the optical effect of the nanoparticles. They increase the translucency of the restoration material, particularly in thin layers, creating a fluent shade transition. Opaque is available for use as a Dentine shade with low translucency, Universal as an enamel shade with medium translucency and Incisal with a high translucency for the incisal edge. The hues have been adapted to correspond with VITA; the intensity (chroma) is regulated by the layer thickness.

There is a total of 23 shades available. A further four opaque dentine shades, which have increased opacity and chroma,
have recently been introduced to cater for darker and discoloured teeth and more complex aesthetic cases.

The individual shades of the different levels of translucency are freely combinable. Alternatively, the best corresponding translucency level can also be obtained from an overview table or directly from the shade guide.

Venus Diamond has four incisal shades: clear, amber, clear opal and yellow opal. As with Venus, the 2-Layer shade guide consists of layered original material and therefore enables realistic shade selection. The shades of the flowable Venus Diamond Flow, which has been adapted to the system, are matched exactly to Venus Diamond and can be easily combined.

The combination of the opaque dentine shade and the appropriate universal shade is generally sufficient for the aesthetic restoration of Class I-V defects. The incisal shades are mainly required for the incisal edges of adolescent or very translucent teeth. In the case of small restorations it is often sufficient to use only the Universal shade due to the shade adaptive effect of Venus Diamond. With demanding larger restorations in the anterior region it is recommended to build up using shades of different translucency to attain a highly aesthetic result. It is also possible to produce attractive results with an adhesive composite restoration due to a carious defect. The existing restoration appeared clinically sufficient, but was also to be replaced during treatment for the new restoration to avoid a transitional zone and therefore a potential high-risk weak spot. (Fig. 1). Based on the positive experience of the patient with composite restorations and the aesthetic appearance, it was decided to build up a direct composite using Venus Diamond. Following anaesthesia and tooth cleaning with a fluoride-free paste, the shade was first selected using the Venus Diamond shade guide for the composites to be used; Venus Diamond and Venus Diamond Flow.

The shade systems of the two materials are identical, ie the shades match exactly. The shade guide is layered using Opaque shade (dentine) and Universal shade (enamel). The operator consequently sees the result of the ideal layering of two levels of opaque shade during shade selection.

Tooth shade A2 was selected as the final shade during shade determination, ie the opaque dentine section was to be built up using shade OM and the enamel using A2. The incisal shade is not generally required in the posterior region. Venus Diamond Flow A2 or Baseline can be used as a cavity liner instead.

The existing restoration and the region infected with caries on tooth 25 were removed using a minimally invasive technique. Figure 2 clearly shows the dentine caries and the demineralised enamel areas. All affected areas were excavated, including dark discoloured sections of dentine. The preparation depth and the bucco-palatal extent of the cavity were kept as small as possible to conserve the maximum amount of tooth structure. Figure 3 shows the total structure loss. The functional occlusal surface as well as the marginal ridges and proximal regions had to be reconstructed.

Following thorough cleaning using a water spray, the cavity was cleared of surplus water and, beginning at the enamel, conditioned according to the etch-and-rinse technique using the 35 per cent phosphoric gel iBOND Etch 55 (Fig. 4). The reaction time on the enamel was 50 seconds and 15 seconds on dentine. All areas of the cavity were then thoroughly rinsed and cleared of surplus water according to the rules of moist bonding.

During drying, care was taken not to overdry the sensitive dentine to avoid collapsing the exposed collagen network and resulting insufficient adhesive penetration. The conditioned enamel and dentine areas were pre-treated using the nano-adhesive iBOND Total Etch according to the total-bond technique (Fig. 5). The adhesive was applied in one layer to the enamel and dentine, in accordance with the manufacturer’s instructions. The solvent was then air dried and the adhesive film polymerised.

The cavity floor was then lined with a thin layer of Venus Diamond Flow A2 (Fig. 6). Venus Diamond Flow improves the adaptation of the composite to the tooth structure, as it smoothes rough irregularities created by the minimally invasive preparation and lines any undercutts, which are difficult to access for a universal composite (Fig. 7).

Various studies also verify that the flowable composite
functions as a stress-breaker and therefore provides a better, more durable bond between tooth structure, adhesive and composite. Venus Diamond Flow has thixotropic properties. During application with a tip the viscosity is reduced and the material can be applied to the required areas. Immediately after application the material is positionally stable and does not flow. Venus Diamond Flow is polymerised for 20s.

In the following steps the original tooth shape was reconstructed using Venus Diamond. First the dentine core was built up using shade OM, anatomically sculpted and polymerised (Fig. 8). Already at this stage care is taken to ensure a functional build-up of the cusps and fissures. The functional-anatomical build-up of the occlusal surface and the marginal ridges is completed using Venus Diamond A2 (Fig. 9).

Superfinish diamonds are used for the rough preparation. Figure 10 shows the Venus Diamond nanohybrid restoration before polishing. A high lustre was quickly and efficiently produced using the Venus Supra polishing system, though conventional polishers can also be used for high-lustre polishing. Figure 11 shows the aesthetic shade blend between the tooth structure and Venus Diamond, which is highlighted when compared with the adjacent restorations.

**Venus Diamond: Summary**
The nanohybrid composite Venus Diamond creates the combination of optimal mechanical properties, durable aesthetics and easy handling. It is ideal for use with both complex restorations as well as the one-layer technique. The shade system is clearly structured and identical to the corresponding Flowable Venus Diamond Flow. Apart from the physical factors, nano-technology promotes polishability and gloss durability.

Venus Diamond is suitable for universal use and can be combined with all methyl methacrylate-based adhesive systems.
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Careful integration of the different dental specialties is the basis of modern dentistry, especially when the treatment goal is an aesthetic and functional oral rehabilitation of the patient.5,6 Today, aesthetic oral rehabilitation integrates three basic concepts—bio-compatibility, mechanics, and, of course, beauty—in order to preserve the anatomical structures of the stomatognathic system and to fulfill functional purposes. At the same time, utmost attention is paid to achieving aesthetic goals in accordance with the current trends in aesthetic dentistry and thus fulfilling the patients’ expectations.7

With comprehensive oral rehabilitation as our main goal, utilisation of the different areas in dentistry becomes extremely important in order to establish a precise diagnosis, treatment plan and finally treatment. Orthodontics, for example, has clearly defined objectives, such as the establishment of a functional occlusion, the preservation of periodontal health and the achievement of a stable result within the boundaries given by physiology and dentofacial harmony.8,9

When the case is presented to the patient prior to any intervention, individual limitations of that particular case must be considered in order to avoid unreal expectations. The patient needs to have a clear idea of the treatment plan, realistic expectations with regard to the final result, and previous and posterior dental needs. Therefore, meticulous examination and good communication with the patient are of utmost importance.10 There are a number of different cases in which the combination of orthodontics and restorative dentistry is advisable, such as Bolton’s and vertical discrepancies, peg-shaped teeth, discrepancies in height and width, diastemas, agenesis, malformations, extrusions, intrusions, attrition etc.11 Not solving the problems mentioned above might result in failure of the orthodontic therapy due to relapse, periodontal complications, occlusal instability or overall dissatisfaction.12,13 However, the careful planning and combination of aesthetics and orthodontic functionality in combination with the new restorative materials available today enable us to obtain harmonic results.14,15

This article seeks to demonstrate the manner in which the goals of an orthodontic treatment were fulfilled in a clinical case. A multidisciplinary approach is indispensable for the achievement of the therapeutic goals of functionality and aesthetics, which are obtained thanks to modern direct restorative dentistry as part of a comprehensive treatment plan and followed by an aesthetic and functional execution of that plan.

Case report
The patient was unhappy with her dental aesthetics after completion of fixed orthodontic treatment. In addition, she did not like the appearance of her incisal edges, nor the texture or translucency of the incisal third of her central incisors (Figs. 1 & 2). After gaining a clear understanding of the patient’s expectations and having informed her of the therapeutic possibility of treating the case with
composite resin, it as decided to make a diagnostic waxup, elongating the height of the clinical crowns to correct the irregularities of the incisal edges. We then proceeded to take a pattern of the future restorations with putty polyvinyl siloxane (PVS). This pattern was then tried in to gain a better idea of the quantity of composite needed to restore the teeth (Fig. 5).

Following adequate cotton roll isolation, and after gaining complete cooperation from the patient, the adhesive protocol for the enamel was followed and restoration with composite resin AMARIS (VOCO) was decided upon. The first increment of restorative material was placed in the PVS pattern and seated with gentle pressure on the enamel, in order to hide the excessive translucent aspect that these teeth showed naturally (Fig. 6). In addition, we applied several brushstrokes of AMARIS Flow High Opaque (VOCO) in areas where it was necessary to hide the translucency, and at the same time spreading the composite onto the surface of the enamel, in order to hide the excessive translucent aspect of these teeth showed naturally (Fig. 6). The pattern that rapidly gave us all the anatomic features of the incisal third but close to the incisal edge itself, and at the same time spreading the composite onto the surface of the enamel, in order to hide the excessive translucent aspect that these teeth showed naturally (Fig. 6). In addition, we applied several brushstrokes of AMARIS Flow High Opaque (VOCO) in areas where it was necessary to hide the translucency, and at the same time it was useful for us to generate small areas of hypoplasia of enamel, resembling the natural characteristics of the lateral incisor. Finally, the whole surface of the incisal edge and the facial surface were covered with AMARIS Translucent again. Thereafter, the whole restoration was brushed up and light-cured for 60 seconds. Next, the occlusion was adjusted and the composites finished (Figs. 7 & 8).

The patient was very pleased with the final result and was informed of the necessary appointments for follow-ups and maintenance, occlusion check-ups, as well as photographic monitoring. The accompanying photographs were taken three months post-operatively, the first one with dried teeth and the second in natural conditions during smile (Figs. 9 & 10).

Editorial note: A complete list of references is available from the publisher.

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