To be held for the first time in South-East Asia, the seventh CAD/CAM & Computerized Dentistry International Conference in Singapore in October will offer a detailed overview of the latest CAD/CAM technologies that are aimed at helping dentists achieve aesthetic and long-lasting all-ceramic restorations chairside. During a presentation in Cape Town, South Africa, CAD/CAM had the opportunity to speak with Ivoclar Vivadent’s Dr Michael Dieter, head of the International Center for Dental Education, who will be hosting the lecture theatre together with Jörg Vogt, international CEREC trainer for Sirona.

CAD/CAM: Dr Dieter, your joint presentation with Mr Vogt in Singapore will be held in form of a lecture theatre. What is behind this concept?

Dr Michael Dieter: Jörg Vogt and I developed this concept two years ago. When the organiser’s managing director, Dr Dobrina Mollova, saw our performance at the sixth CAD/CAM & Computerized Dentistry International Conference in Dubai last year, she named it a “lecture theatre” because of its truly interactive nature. Jörg and I present in continuous dialogue with each other, which makes the lecture more interesting, not only for the audience but also for us. Additionally, case demonstrations with the CEREC AC will be performed live on stage.

Primarily, our lecture is aimed at dentists who are interested in minimally invasive aesthetic treatment solutions or who simply want to get into dental CAD/CAM technology. Our goal is to provide a predictable guideline for the clinical treatment sequence using chairside CAD/CAM technology. However, the lecture is also suitable for any dentist who is interested in all-ceramics as a modern restorative treatment option.

From my experience, I can say that many practitioners still have little knowledge of what all-ceramic material they are supposed to use for various clinical situations. With our lecture theatre, we aim to demonstrate the main differences in terms of aesthetics, particularly for use in the anterior dentition, and the physical properties or strength of the various all-ceramic systems.

CAD/CAM: What do you think the reason is for this lack of knowledge?

Recently, we have seen the rapid development of materials and technologies. For the practitioner, it is sometimes difficult to keep up with all these new developments. This is why continuous education is becoming more and more important.

If we look at the increasing number of all-ceramic systems on the market that manufacturers claim to be aesthetic, we can in fact perceive significant differences. The questions remain: what does "aesthetic" mean, and how suitable are these materials in clinical reality? This is exactly what we will be discussing in our lecture: translucency, opalescence and fluorescence—these optical properties of the natural tooth can be reproduced in the patient’s mouth with select modern all-ceramic materials.

While I will focus on the treatment sequence from a clinical perspective, Mr Vogt will provide insights into the CAD/CAM process using the CEREC AC and the latest software (version 4.03). He will demonstrate live, step-by-step, how to design the restorations and I will illustrate the related clinical cases.

CAD/CAM: What are the most common mistakes when choosing materials?

Selecting the right material is not the only difficulty. The correct tooth-preparation technique remains a challenge for many dentists because all-ceramics require an entirely different preparation design compared with the commonly used metal alloys or metal ceramics. If mistakes are made at the beginning, fracture of the restoration becomes much more likely. Therefore, preparation techniques for all-ceramics with regard to CAD/CAM application will be in focus as well.

"Lecture theatre" —a new interactive concept—on chairside CAD/CAM dentistry

An interview with Dr Michael Dieter, Ivoclar Vivadent, Liechtenstein
What impact has CAD/CAM technology had on the usage of aesthetic restorations in the dental practice?

With CEREC, CAD/CAM technology has been available for chairside application for more than 27 years. So this is a well-documented procedure with long-term clinical success. Today, there are approximately 34,000 CEREC units in use, which demonstrates impressively that this technology is still driving aesthetic dentistry in the clinical practice. The main indications are inlays, onlays, partial crowns, full crowns and veneers. In addition, up to four-unit posterior bridges are now possible, either as a temporary solution with polymer blocks (e.g. Telio CAD, Ivoclar Vivadent) or as a permanent restoration with a high-strength zirconium dioxide/lithium disilicate material (e.g. IPS e.max CAD-on, Ivoclar Vivadent).

What are the aesthetic limitations of chairside CAD/CAM?

Generally, posterior restorations like inlays, onlays and crowns can be realised with good aesthetic results. With anterior restorations like crowns and veneers, the aesthetic outcome largely depends on the adjacent teeth that we have to match intra-orally. Highly aesthetic colour gradients for CEREC restorations can be achieved with polychromatic blocks (e.g. IPS Empress CAD Multi, Ivoclar Vivadent) or by shading and staining monochromatic lithium disilicate blocks (e.g. IPS e.max CAD, Ivoclar Vivadent).

All this can be carried out by the dentist chairside. If the adjacent teeth show visible internal structures like mamelons, dentists need the support of dental lab technicians to optimise aesthetics—this represents the aesthetic limitation of chairside CAD/CAM.

Have restorations become more complex with chairside CAD/CAM?

On the one hand, yes, the procedure has become somewhat more complex because the dentist is also responsible for the design, milling and surface finishing of the restoration. On the other hand, impressions and temporaries are no longer necessary, which makes life easier for both the dentist and the patient.

What are the critical factors for achieving successful long-term clinical outcomes?

In addition to the factors described above, cementation, particularly for glass-based ceramic restorations, is a clinical step of paramount importance for long-term clinical success, since it is directly linked to the aesthetic outcome and the fracture strength of the final restoration. Which ceramics have to be bonded? Which ceramics can be cemented conventionally? How does one prevent post-operative sensitivity after cementation? All these questions will be answered in detail during the lecture.

Many speak of CAD/CAM technologies as the next revolution in dentistry. Do you agree?

I would say that the revolution will continue. I am still fascinated by the materials and the manufacturing process. All-ceramic restorations are not only aesthetically pleasing but also minimally invasive. Therefore, patients benefit not only from better looking teeth, but also from the fact that much less natural tooth substance has to be removed compared with traditional restorative techniques and materials.

The next few years will show what CAD/CAM manufacturers have kept in reserve, both chairside and labside. Materials manufacturers like Ivoclar Vivadent will continue to develop highly aesthetic and user-friendly all-ceramic systems that aim to further reduce the minimum material thickness—requiring even less invasive tooth preparations—to the benefit of the patient.

Thank you very much for this interview.