

12th edition
**CAD/CAM &
 Digital Dentistry**
 Conference/Exhibition

5-6 May 2017, Dubai

Hands-On Training in Dubai Digital Smile Design Part 1

Tutor: Dr. Eduardo Mahn, Chile

Date: 01 May 2017 | 09:00 - 18:00

Venue: InterContinental Hotel Festival City, Dubai, UAE

Target Audience: Dentists

Digital Smile Design Part 2

Tutor: Dr. Eduardo Mahn, Chile

Date: 02 May 2017 | 09:00 - 18:00

Venue: InterContinental Hotel Festival City, Dubai, UAE

Target Audience: Dentists



Course Abstract

The course will first present the necessary theoretical background about DSD with a short summary of it. Then tips and tricks about photo-video and how to analyze the patients from the facial perspective are going to be given. Facial, smile and tooth references are going to be given.

The course will also provide the participants with written material explaining several techniques presented during the lectures.

Course Objectives

The participants will learn to:

1. Take pictures of the patients with any smartphone
2. Make a simple but effective video fundamental for any diagnostic process
3. Perform the Digital Smile Design protocol on their computers
4. Apply different esthetic parameters on the analysis of their patients
5. Correct efficient wax-ups
6. Perform a mock-up
7. Document the mock-up and show it in an emotional way to the patient

The rise of digital dental restorations

By Brendan Day & Marc Chalupsky,
 DTI

Composite-based CAD/CAM materials have been marketed as composite ceramics or hybrid ceramics to underscore their longevity. The latest generation of reinforced composite blocks demonstrates excellent material properties, which are in part even superior to those of ceramics. In order to investigate this, Dr Ralf Boehner, a leading expert on composite-based CAD/CAM materials, recently compared the material properties and luting strategies of certain reinforced composite blocks to those of ceramics.



Digital production is becoming increasingly popular in the fabrication of dental restorations. In this process, the restorations are ground to their final shape using digital data sets. These digitally produced restorations have often used ceramic-based materials. Although these ceramic materials have good aesthetics and resist abrasion, they also have drawbacks, including a relatively high modulus of elasticity, a tendency to chip and abrasion of the antagonist. Furthermore, modifying or repairing ceramics intra-orally is quite an elaborate procedure. Therefore, there is a need for composite materials for use with the CAD/CAM method, in addition to light-curing composites, for permanent restorations.

What is a composite?

A composite is generally described as a material consisting of two or more different components that are bonded to each other. CAD/CAM composites consist of a matrix of polymerised methacrylates, which contain different fillers (glass or ceramic), depending on the product. Composites must not be confused with purely ceramic CAD/CAM materials or treated as such. For example, as composite materials should not be fired, their processing procedure is considerably easier. In addition, adhesive

luting is adapted to the composite. Similar to light-curing filling materials, composite-based CAD/CAM materials are easy to modify and polish. Furthermore, their repair can be performed intra-orally. In general, the luting strategy of CAD/CAM-fabricated restorations is crucial for the success of treatment.

Material properties

Compared with ceramics and polymer-infiltrated ceramics, CAD/CAM composites have a lower modulus of elasticity and therefore they dampen masticatory forces far better and promote comfort while chewing. Physical studies have also confirmed that CAD/CAM composite materials have excellent mechanical properties. Compared with a tested ceramic material (IPS Empress CAD, Ivoclar Vivadent) that does not need to be fired after the grinding process, both Lava Ultimate (3M ESPE) and BRILLIANT Crios (Coltène/Whaledent) demonstrated higher flexural strength.

Performance in the mouth

It is known that ceramic materials can lead to increased abrasion of the antagonist during mastication compared with dental enamel. Owing to

their lower modulus of elasticity and their composition, composite materials should cause less abrasion of the antagonist. Interesting results on this matter were obtained in a study of the abrasion of CAD/CAM materials of the dental enamel antagonist. The CAD/CAM composite materials demonstrated less abrasion of the enamel antagonist compared with the tested ceramic materials and the polymer-infiltrated VITA ENAMIC hybrid ceramic (VITA Zahnfabrik). According to the study, BRILLIANT Crios is gentle on antagonists, as is usual for composite materials, and yet it results in low abrasion, similar to ceramics.

Luting strategy

In contrast to pure ceramic materials, CAD/CAM composites must always be luted adhesively, though the exact procedure differs for each composite. The following explains the luting strategy both in general and specifically for BRILLIANT Crios. In this case, the composite is made of a dental glass and a matrix of polymerised resin, and the resin matrix also contains non-polymerised methacrylate double bonds. After the restoration has been fabricated, the surface to be bonded is sand-

blasted to enlarge the surface and to create mechanical retention. This surface then contains particles of dental glass and the polymerised resin matrix. As sandblasting is a very abrasive process, care should be exercised so not too much substance is removed. The effect of the sandblasting procedure is comparable to a pretreatment through sandblasting with corundum for zirconia or etching with hydrofluoric acid for silicate ceramics. In all cases, the result is an enlargement of the surface and the establishment of mechanical retention.

Improvement of the adhesive bond
 The strategy for achieving a perfect adhesive bond varies, depending on the composition of the CAD/CAM composite material. The process should be as simple as possible to avoid potential errors in application that may negatively affect the adhesive bond. In general, the following rules apply:

- Maintain an enlarged surface for bonding and creating mechanical retention.
- Bond to the filler materials.
- Bond to the polymerised resin matrix.

Adhesion to tooth substance

In the case of light-curing bonds, similar to the case with conventional filling therapy, the light curing should follow the instructions for use after application to the tooth substance. Furthermore, the luting material used should not be too opaque. Otherwise, not enough light may penetrate the restoration to reach the uncured inhibition layer of the bond during final light curing. In such cases, dual-curing or chemically curing bonds are indicated.

Conclusion

Composite-based CAD/CAM materials are very similar to light-curing filling materials in terms of their design; thus, they are just as easy to modify and polish after the grinding process. Shade adaptations or modifications—for example, to create a contact point—are easy to realise with the appropriate adhesive technique and composite. Compared with light-curing composites, CAD/CAM composite materials are fabricated extra-orally under perfect industrial conditions; therefore, they demonstrate improved mechanical properties. ^{DTI}