Ceramic instead of composite

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Dr Tobias Otto, a dentist in private practice in Aarau in Switzerland, witnessed the 'death' of amalgam as a student at the University of Zurich. The University was reacting in response to the prohibition of amalgam in Sweden. Composites and the adhesive technique were the new hopefuls for treatment with fillings. The tooth-coloured restorations met the patients' aesthetic desires. Dr Otto learned how to perform this time-consuming procedure, which includes rubber dam, dentine adhesives, the composite layering technique and light polymerisation. He also saw how two- to four-surface composite restorations soon fractured under masticatory loading due to insufficient contact points and porosities, became discoloured and abraded after longer service, or needed replacement because of recurrent caries.

Inspired by natural aesthetics, patients no longer found cast gold fillings attractive. The new alternative, such as laboratory-manufactured ceramic inlays, taught Dr Otto that this restoration technique too failed to provide the hoped-for, long-term survival quality and was too expensive. He found that the fracture resistance of the delicate edges of pressed silicate ceramic inlays left much to be desired, as did the colour stability of the surfaces. Dr Otto dreamt of an industrially sintered, dense, stable ceramic. But how could this be milled?

While he studied hard for his licensing exams, the first CEREC machine, which could mills an inlay from an industrially produced ceramic blank, was being developed in the clinic one floor above his office. The protagonists of this method were confronted by many sceptics who denied the new system their support because of the adhesive joint between ceramic and enamel. However, Dr Otto recognised that here was a highly resilient silicate ceramic, whose flexural strength surpassed that of both composites and laboratory-layered sintered ceramics.
He began working with CEREC 1 in 1989 in a partner practice in Zurich. He wished not only to provide his patients with aesthetic and long-lasting restorations, but also to prove to the hesitant university and the professional community that this method, together with adhesive bonding, was capable of providing the basis for highly resilient ceramic restorations. With typical Swiss thoroughness, he documented all of the CEREC treatments he performed and recorded all findings from recall appointments. “I was convinced that in the long run, ceramic would be more durable and economical than composite,” remembers Dr Otto. “For three and more surfaces, composite is, in my opinion, a poor compromise and, if recurrent caries develops or the filling has to be replaced a short time later, the patients will consider me a bad dentist. In terms of long-lasting dental aesthetics, we Swiss are very particular; we don’t accept compromises.”

Time would prove him right. After ten years, data from his practice demonstrated a survival rate of 90.4% for CEREC inlays and onlays. Thus, these results corresponded to those of the gold standard, that is, cast gold fillings.1 The study was published internationally and the media acknowledged the findings for ceramic restorations in private practice. Meanwhile, Dr Otto has been working with a CEREC 3 unit, and the study is now in its 18th year. The consistently applied multistep adhesive technique has proven to be sufficient, even with an adhesive joint of 150µm. With a survival rate of 88.7 per cent after 17 years, Dr Otto has set the new gold standard with his restorations.2 He satisfies his patients’ dental and aesthetic desires using CEREC thanks to the material, which combines excellent aesthetics with stability, and to the longevity, which makes the restoration economical. “What my patients appreciate about CEREC is that their tooth-coloured ceramic restoration is manufactured and inserted in one sitting, and for an average yearly cost of 47 Swiss Francs—based on the minimum expected service life—they really get tailor-made aesthetics.”

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

Fig. 2: Patients appreciate that the complete treatment requires just one sitting. (Photo: Dr Otto)

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