In 1985, Prof Werner Mörmann, Dr Marco Brandes-tini and their team laid the foundations for a new treatment system consisting of optical impression-taking, CAD and numerically controlled milling.

This new concept motivated large numbers of clinicians and prompted them to carry out their own follow-up investigations.

Today, CEREC is one of the most closely scrutinised dental procedures, a fact reflected in more than 250 clinical studies and approximately 6,500 longitudinal studies of restorations.

Long-term observations indicate that adhesively bonded restorations fabricated using the first versions of the CEREC system (CEREC 1 and 2) achieved higher survival probability rates (according to Kaplan–Meier) than conventional layered ceramic restorations. CEREC restorations with service times in excess of 20 years still display a degree of clinical excellence, which is normally attributed to metal-based restorations.

Immediate treatment stabilises enamel
The goal was to deploy CAD/CAM technology to create immediate all-ceramic restorations chairside without the need for temporaries. Clinical experience has demonstrated that provisionally restored inlay cavities have a significant, negative influence on the integrity of the enamel. In the course of chewing simulations, cracks occurred in the oral and vestibular enamel surfaces. In addition, spalling was observed at the enamel margins. Such defects did not occur in cavities that had been treated immediately using chairside CEREC inlays.

The micromechanical bond between the ceramic inlay and the hard tooth tissue stabilises the cavity walls. In combination with the adhesive bond, the stabilising effect of the immediate CEREC restoration on the residual tooth obviously offsets the consequences of wider adhesive gaps, as evidenced in long-term clinical findings.

After two years of clinical service, there were no clinically identified cases of crown fracture or surface chipping.

Fig. 1_LS2 crowns after the two-year recall visit.

Fig. 1_LS2 crowns after the two-year recall visit.

Dr Dennis J Fasbinder, looks at CEREC

25 years of proven clinical performance

Dr Dennis J Fasbinder

is Clinical Professor in the Department of Cariology, Restorative Sciences and Endodontics at the University of Michigan.

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High-strength CEREC crowns
So far, long-term investigations have concentrated almost exclusively on CEREC crowns made of feldspar ceramic materials. At the School of Dentistry, University of Michigan, we set out to investigate the material suitability of lithium disilicate (LS2, IPS e.max CAD, Ivoiclar Vivadent) for full contour, monolithic crowns. Our aim was to utilise the enhanced flexural strength of LS2 (350–400 MPa) in order to withstand the chewing forces in the premolar and molar regions.

The full crown preparation included 2.0 mm functional cusp reduction, 1.5 mm occlusal reduction in the central fissure in combination with rounded shoulders and axillary reduction of 1.2 mm. Using the CEREC 3 system, 62 crowns were created for 43 patients and then placed with the aid of dual-cure luting cement. There was a small degree of sensitiv ity reported in the first week.

After two years of clinical service, there were no clinically identified cases of crown fracture or surface chipping.

Clinical monitoring revealed a positive long-term survival prognosis. Although two years in situ is a relatively short period of time, the survival rates are on par with those obtained in similar studies of ceramic crowns (Fig. 1).