

# 25 years of proven clinical performance

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In 1985, Prof Werner Mörmann, Dr Marco Brandestini 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.

Fig. 1 LS<sub>2</sub> crowns after the two-year recall visit.

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. On the basis of this extensive long-term experience, there are convincing reasons for recommending CEREC-fabricated inlays, onlays, partial crowns, veneers, anterior crowns and posterior crowns as an alternative to conventional 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 conclusion was clear: the immediate treatment of the tooth cavity with chairside inlays and the elimination of the need for a temporary restoration reduce the risk of enamel cracking and marginal spalling. 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.

## 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 (LS<sub>2</sub>, IPS e.max CAD, Ivoclar Vivadent) for full contour, monolithic crowns. Our aim was to utilise the enhanced flexural strength of LS<sub>2</sub> (360–400 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 axial 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 sensitivity reported in the first week post-operatively. This had subsided by the third week and there were no reports of sensitivity at the one- or two-year recall evaluation. 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).

### about the author

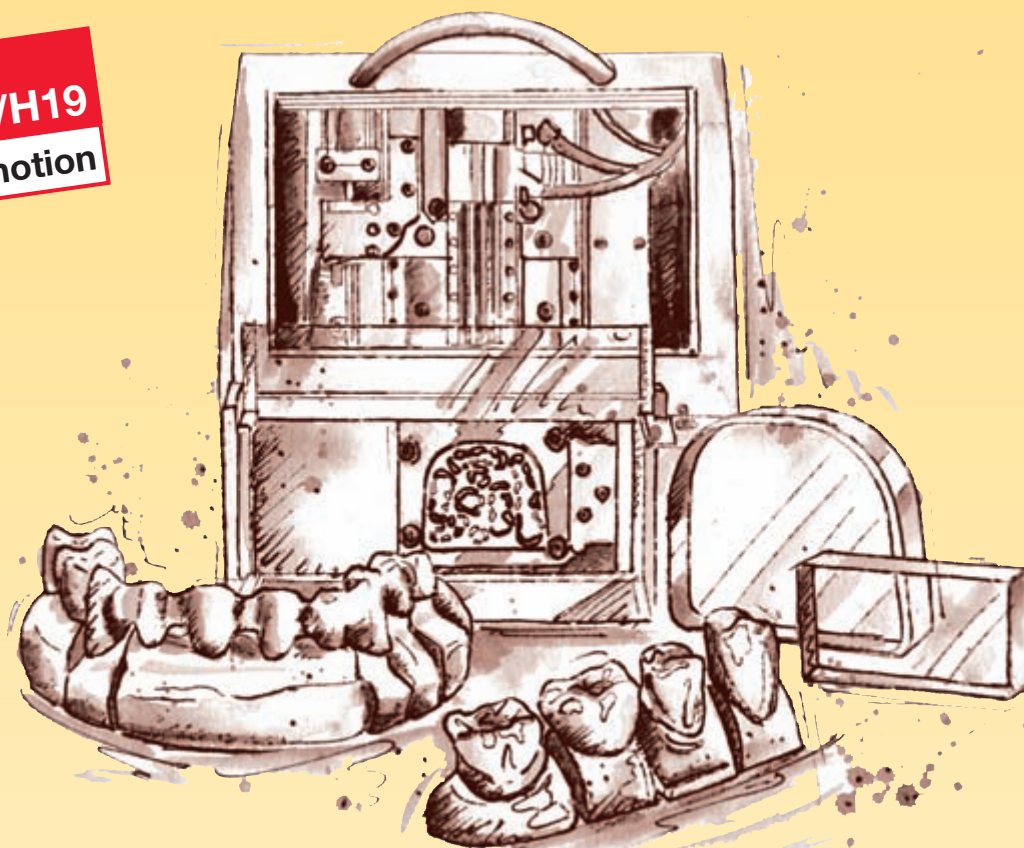
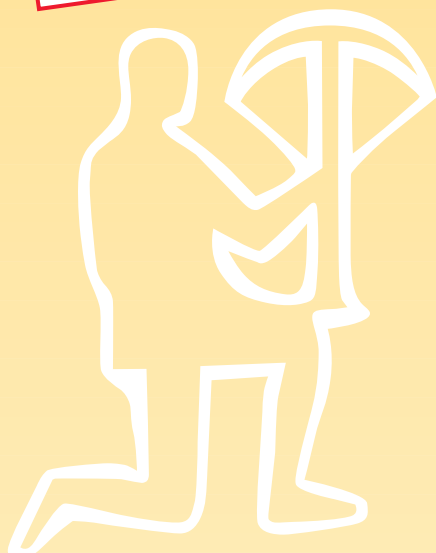
CAD/CAM



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