

Replacement of a ceramic onlay by using the CEREC technique

Kari Pihlman, DDS
Espoo, Finland

Introduction

The growing demand of patients for aesthetic and durable biological materials has led to an increased production of ceramic restorations. The traditional use of cements is possible with reinforced ceramic frameworks, but not with glass-ceramic or feldspar porcelain. The predictable and reliable bond of the ceramic restoration into the tooth structure is the key to success.

Ceramic restorations are usually made in dental laboratories, and two separate appointments at the dentist's office are needed.

Chair-side-made computer-aided ceramic restorations have been in use already for 20 years, but during the last five years, thanks to 3-D CEREC, they have become even more widely used. Benefits of the chair-side technique include homogenous prefabricated material and the completion of the restoration during the same appointment.

The patient

A healthy 55-year old female, the general condition in the oral cavity is well balanced.

The problem

Fractured ceramic filling (d. 45); the gap is collecting food, and irritating the patient. The fracture was caused by a grain of sand in the seafood salad.

Treatment plan

Replacement of the fractured ceramic filling during one session by using the CEREC correlation technique.

The old morphology was copied by scanning the tooth before the preparation. For the optical impression the area to be scanned was powdered with titanium oxide powder to eliminate light reflections. The old ceramic filling was removed, and the cavity was finished with suitable finishing rotary instruments.

The preparation was powdered again, and the optical impression was taken. The final design was performed on the computer screen, by using the shape tool the fissure morphology was added onto the occlusal surface. After checking the contacts the new onlay was ready for milling.

A suitable shade of ceramic material and the right size of the block were selected, the milling was performed in the CEREC 3 milling unit.

After checking the proximal surfaces of the milled restoration it was polished by hand. The bondable surface was etched by using hydrofluoric acid (9% acid for 60 s.). After rinsing and drying, the surface was silanized according to the instructions.

The prepared tooth was isolated by using Kerr's rubber-dam, OptiDam™ with SoftClamp™ (a metal free, universal clamp) and Fixafloss® (a combination of a waxed dental floss with a clamping element). The intact tooth surface of d. 44 was covered with Blue Adapt® Sectional Matrix. The wooden wedges were used to help the removal of excess cement from the proximal areas.

The preparation was etched and bonded with OptiBond® FL according to the instructions: After rinsing the etchant (Kerr Gel Etchant 37,5%) OptiBond® FL primer was gently scrubbed onto the moist preparation for 15 sec. After gently air drying for approximately 5 seconds the dentin surface displayed a shiny appearance without any liquid movement. OptiBond® FL adhesive was applied over the entire preparation as well as on the silanized ceramic surface. The adhesive layers were air-thinned, but not light cured before application of the cement. The restoration was luted by using NX3 Nexus® (white) Third Generation Universal Resin Cement. Light curing for 2-3 seconds was performed with Kerr Demi™ LED-light. By holding the seated restoration with a suitable hand instrument, the excess cement was easily removed in gel form. The final light curing was performed under the protection of glycerol gel according to the instructions.

After adjusting the bite the restoration was polished with Identoflex Diamond polishers for ceramic materials and an OptiShine® brush, resulting in enamel-like gloss.

Pictures:



Figure 1 - General view



Figure 2 - Ceramic onlay in d. 45



Figure 3 - Occlusal view of the same tooth: part of the ceramic is fractured



Figure 4 - Old filling is removed; the finished cavity after powdering with titanium oxide antireflective powder

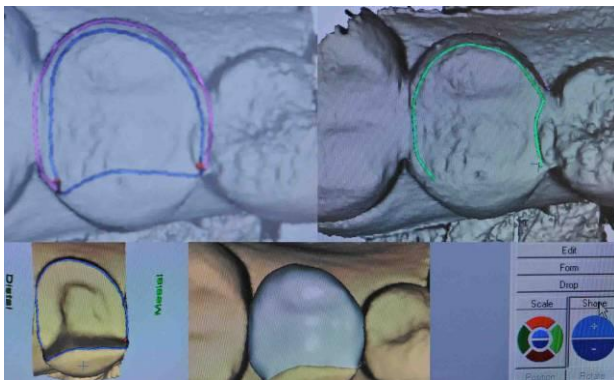


Figure 5 - Virtual construction of the restoration on the computer screen

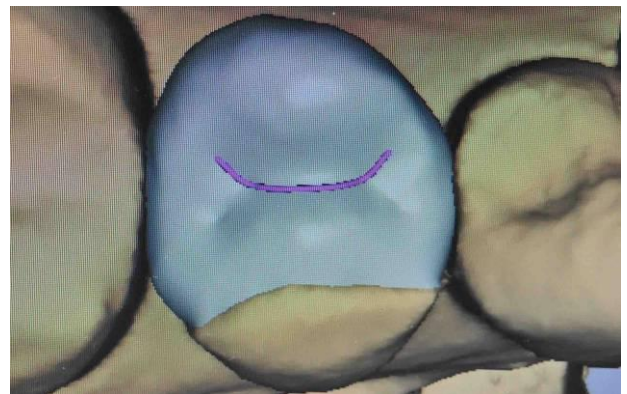


Figure 6 - Final occlusal shaping on the screen



Figure 7 - SoftClamp™ on the left, Fixafloss® on the right side / Try-in of the milled restoration



Figure 8 - Wedging and protection of the intact tooth

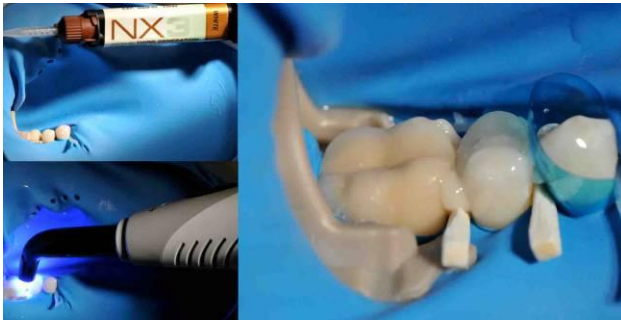


Figure 9 - After bonding the restoration is luted and light cured; after light curing of 2-3 seconds NX3 resin cement is in gel form, and the removal of excess material is easy



Figure 10 - Final restoration after finishing and polishing