

Combination of Indirect & Direct Restorations in One Quadrant

Claus-Peter Ernst,
Germany

Chairside restorations of a complete quadrant are challenging especially in cases where a complex cusp build-up is required in several teeth. A direct restoration procedure can be problematic e.g. if all cusps of a molar have to be restored, while the procedure is well-suited for cavities with remaining dentin-supported peripheral walls and cusps. When both types of defects are present, a combination of direct and indirect procedures may be indicated.



Figure 1: Initial situation with three cement restorations on the premolars and the second molar as well as a pre-endodontic build-up on the first molar.

Patient Case

In the present case, a 40-year-old female patient required a quadrant restoration. The maxillary right first molar received endodontic treatment. Figure 1 shows the initial situation with the preendodontic build-up and post-endodontic cavity closure. Due to the dimensions of the defect, the cusps had to be included in the restoration.

Since the palatal and buccal areas were intact to a large extent, a partial crown was recommended. The temporary cement restorations on the second molar and the premolars in the first quadrant were largely intact, but caused food impaction in the approximal areas. Since the patient asked for a complete treatment in one appointment, it was planned to combine a partial crown produced in a chairside procedure with three direct composite restorations.

Preparation and Indirect Procedure

The first molar was prepared to receive a partial crown (Fig. 2). At this, part of the approximal composite restorations and the post-endodontic closure was preserved. In addition, the old cement restorations were removed and caries excavated. For the indirect restoration, 3M™ ESPE™ Lava™ Ultimate CAD/CAM Restorative became the material of choice.

This material offers a high flexural strength allowing for the creation of thin vertical dimensions and ensures low antagonist wear while being resistant to abrasion. The user benefits from the fact that processing of this material is quicker and intra-oral polishing easier than that of many other permanent restoratives. The partial crown was produced using the CEREC® system (Sirona Dental). Unlike pure ceramics, the inner surface of the Lava Ultimate restoration was sandblasted with high-grade aluminum oxide (grain size 50 µm, pressure 1 to 2 bar) prior to its placement.



Figure 2: Situation after caries removal and tooth preparation.

Restoration Placement

3M™ ESPE™ Scotchbond™ Universal Adhesive and 3M™ ESPE™ RelyX™ Unicem Adhesive Resin Cement were used for the adhesive cementation procedure.

At first, the remaining composite surfaces were sandblasted to create a micro-retentive surface structure that is decisive to obtain a strong, longlasting bond to the indirect restoration.

Then, phosphoric acid was applied primarily on the enamel margins (Fig. 3). After removal of the acid, Scotchbond Universal Adhesive was applied. Figure 4 shows the adhesive layer after evaporation of the solvent. At this stage, the manufacturer recommends light-curing of the adhesive on the tooth surface.

The sandblasted surface of the restoration was also pre-treated with Scotchbond Universal Adhesive before the dual-cure resin cement in the shade translucent was applied on the tooth and the partial crown placed.

After removal of the excess cement, the restoration was light cured from an occlusal, palatal and buccal direction for 20 seconds each. Figure 5 shows the result.

The detailed work steps in the cementation procedure in accordance with the recently updated recommendations of the manufacturer are summarized in Chart 1.

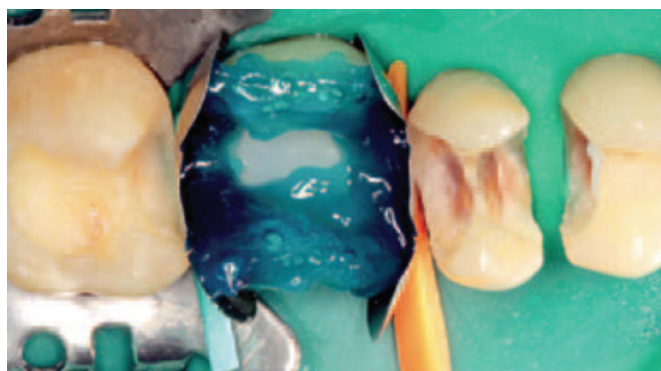


Figure 3: Etching with phosphoric acid (enamel etching recommended, dentin etching optional).



Figure 4: Adhesive layer after evaporation of the solvent.

Step 1	Apply Scotchbond™ Universal Adhesive to the tooth surface.
Step 2	Direct a gentle stream of air over the liquid until the solvent has evaporated.
Step 3	Light-cure the adhesive.
Step 4	Sandblast the restoration's inner surface.
Step 5	Carefully remove all powder particles (ideally in an ultrasonic bath or with water spray and an oil-free air stream).
Step 6	Apply Scotchbond™ Universal Adhesive to the restoration (contains silane).
Step 7	Gently air-dry the adhesive layer to evaporate the solvent. Light-curing is not necessary on the Lava™ Ultimate restoration.
Step 8	Apply RelyX™ Ultimate Adhesive Resin Cement.
Step 9	Place the restoration.
Step 10	Remove excess cement with a sponge pellet in the uncured state or with a sharp instrument in the gel state.
Step 11	Light-cure the restoration (ideally under glycerin protection).

Chart 1: Detailed work steps in the cementation procedure for 3M™ ESPE™ Lava™ Ultimate restorations in accordance with the recently updated recommendations of the manufacturer

Direct Procedure

Partial matrices (Contact Matrix Ultra Thin Flex, Danville Materials) were placed on the premolars and the second molar and fixed with interproximal wedges as well as one clamping ring.

Subsequently, all three cavities were etched simultaneously with 34% orthophosphoric acid (3M™ ESPE™ Scotchbond™ Universal Etchant) for 15 to 30 seconds (Fig. 6). After rinsing with water, Scotchbond Universal Adhesive was applied and polymerized when the solvent had evaporated completely.

The composite restorations were created using 3M™ ESPE™ Filtek™ Supreme XTE Universal Composite in the body shade A3, starting with the second molar.



Figure 5: Intra-oral situation after removal of excess cement.

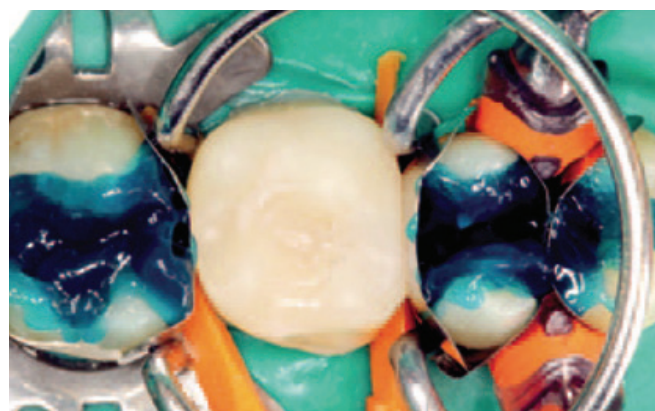


Figure 6: Etching of the cavities prior to the direct restoration procedure.

Results



Figure 7 ...

Shows the final result of the quadrant restoration with a partial crown made of Lava Ultimate restorative in the shade A3 LT (low translucent) and three direct composite restorations immediately after finishing and polishing.



Figure 8 ...

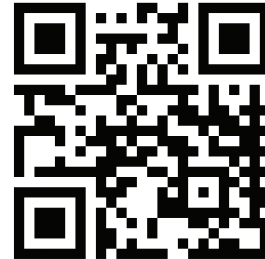
Shows the situation two weeks later. With the combination of a partial crown and direct restorations, a stable and anatomically correct quadrant restoration was obtained.

Contact: 👤 Prof. Dr. Claus-Peter Ernst ✉ ernst@uni-mainz.de

Register For Updates

3M.com.au/OralCareJournal

3M Oral Care
Online Journal



3M Oral Care

3M Australia Pty Ltd

Building A, 1 Rivett Road
North Ryde NSW 2113
Ph: 1300 363 454
www.3M.com.au

3M New Zealand Ltd

94 Apollo Drive
Rosedale Auckland 0632
Ph: 0800 80 81 82
www.3M.co.nz

Published by 3M Oral Care
© 2016, 3M. All Rights Reserved