

# The zirconia solution for severely discoloured preps

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## Introduction

The restoration of fractured and aesthetically compromised central incisors is crucial for both function and appearance. Zirconia crowns offer a combination of strength, biocompatibility, and aesthetics, making them an ideal choice for such restorations. This case report describes the treatment of a patient with these issues, highlighting the steps taken to achieve a successful outcome.

## Case report

A 30-year-old patient presented with a chief complaint of a broken crown on tooth 11 and a general dissatisfaction with the appearance of his teeth.

Intraoral examination revealed a fractured porcelain-fused-to-metal (PFM) crown on tooth 11, and a similar crown on tooth 21 (Fig. 1). Both crowns had a triangular shape, which was not aesthetically favourable. The contact points between teeth were very small and too high, leaving black triangles between the teeth. The patient exhibited good oral hygiene with otherwise sound teeth and good periodontal health.

It was planned to replace the old PFM crowns on both central incisors with all-ceramic crowns and bleach the rest of the dentition to enhance both function and aesthetics. The bleaching occurred six weeks in advance to ensure colour stability. During the removal of the old crowns and tooth preparation, the severe discolouration was obvious, and there was a discrepancy in both centrals in shape as well as colour of the remaining tissues (Fig. 2). Precise impressions of the prepared teeth were taken for the manufacturing of zirconia crowns in the laboratory. Temporary crowns were made and placed on teeth 11 and 21 to protect the preparations and maintain aesthetics during the interim period.



Fig. 1: Initial situation



Fig. 2: Severe discolouration is obvious after the preparation

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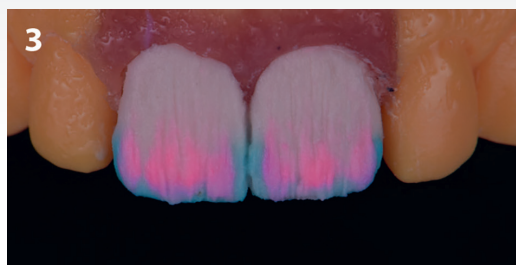


Fig. 3: Layering with Dentin shades of the Initial veneering system



Fig. 4: Result after the first firing



Fig. 5: Enamel layering and final corrections

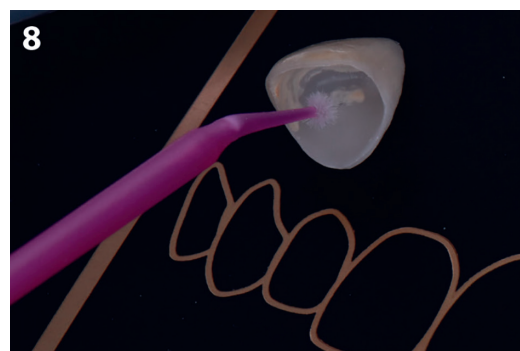
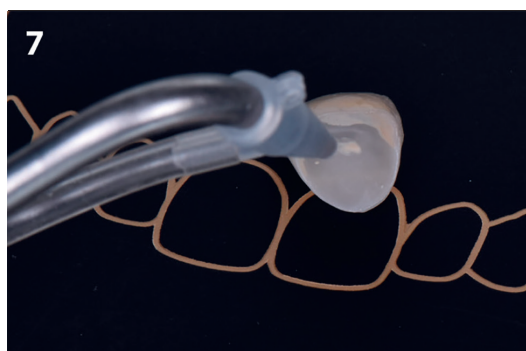


Fig. 6: Lab result

Two anatomically reduced crowns were milled from zirconia in the lab. Prior to layering with Initial (GC) feldspar veneering ceramics, an light reflective liner was used to mask the discolouration. When started with a liner in the correct shade and value, the veneering ceramic for characterisation can be left rather thin, which is beneficial for the strength. An INside (Initial veneering ceramics) shade of saturated, opaque dentine was applied in the cervical as well as the approximal area, followed by a dentine-shade in the centre (DA2). At the free edge, a ceramic mixture of low saturation and Translucent Neutral (TN) were applied. The absorption masses were made with blue translucent modifier (TM-01)

and the mamelons were made with Fluo Dentin Sand (FD-93) mixed with DA2 (Figs. 3-4). At the end, a final, thin layer of Enamel was applied and the final corrections were made (Figs. 5-6).

After the try-in, the crowns were thoroughly cleaned and the inner surface was sandblasted and primed with G-Multi PRIMER (GC; Figs. 7-8). Rubber dam was placed and the preparations were cleaned as well with air abrasion (AquaCare, Velopex; Fig. 9) and subsequently etched with phosphoric acid (Fig. 10) to maximise retention. To obtain immediate strength, G-CEM ONE Adhesive Enhancing Primer (GC) was applied to the preparations and dried with



Figs. 7 & 8: The zirconia crowns were sandblasted and primed with G-Multi PRIMER

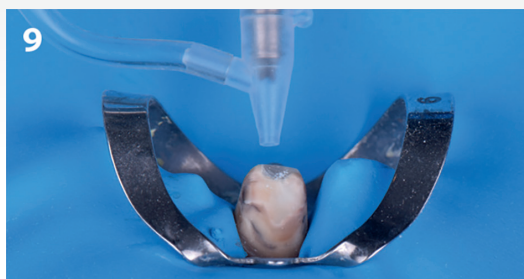


Fig. 9: Preparations were cleaned with air abrasion (Aquacare, Velopex)

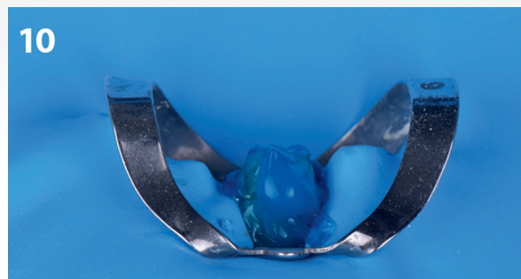


Fig. 10: Phosphoric acid etching of the preparations



Fig. 11: Priming with G-CEM ONE ADHESIVE ENHANCING PRIMER



Fig. 12: Cementation with G-CEM ONE universal resin cement, shade White Opaque

air (Fig. 11). A universal resin cement in white opaque shade (G-CEM ONE, GC) was applied (Fig. 12) and the crown was seated onto the teeth

(Fig. 13). Remnants were carefully removed and the margins were polished after light-curing. The patient expressed his satisfaction with the successful outcome, resulting in improved function and aesthetics of the central incisors (Figs. 14-15).

### Discussion

The two most popular all-ceramic restoratives are lithium

disilicate and zirconia. While lithium disilicate is most often chosen for frontal teeth because of its excellent aesthetics, its higher translucency is not desirable in every case. In this case, zirconia crowns provided an effective solution for restoring both the function and aesthetics of the patient's central incisors. Zirconia's strength and biocompatibility, combined with the precision fit achieved through accurate laboratory work and excellent communication between lab and dentist contributed to the positive outcome. While the shade of the used cement is less important than the restorative material, an opaque shade is recommended in

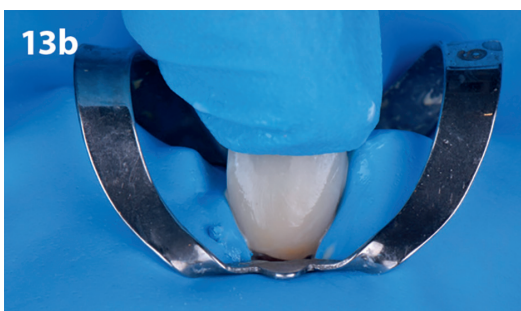
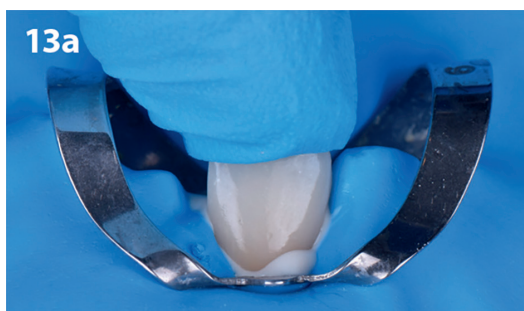


Fig. 13a & b: Seating of the crown. Cement excess was easily removed



Fig. 14a & b: End result in natural light and polarised light. A good colour match could be obtained, despite the severe discolouration of the preps.



Fig. 15a & b: Maxillary teeth before (top) and after (bottom) the treatment, showing a remarkable improvement in function as well as aesthetics.

case of severe dyschromia. After all, the sum of all steps will contribute to a satisfactory end result (Fig. 16).

### References

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Fig. 16: A satisfactory end result