

## Simulating Natural Dental Outlook in Esthetic Dentistry: A Case Report

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**ABSTRACT:** *Aesthetic dentistry is concerned not only with the dental appearance but also the enhancement of a person's smile. Creating a natural dental outcome harmonious with adjacent teeth is the main aim of aesthetic dentistry. A good observation, knowledge of dental anatomy and dental materials are required for this. Today's cosmetic dental treatments are more durable and predictable than before with the technological advancements in natural-looking, tooth-colored dental materials. Additionally, more conservative techniques are being used in order to mimic natural dental tissues, depending upon patients' specific clinical situation. These kind of procedures can be held in a single visit by using aesthetic dental resins mostly without any preparations. This makes direct aesthetic dental rehabilitations such as smile designs more comfortable and convenient for the patients.*

*In this case report a patient with dental aesthetic problems due to crown fractures on maxillary centrals, treated with direct aesthetic composite resin restorations in one appointment. In one-year recall, no discolorations, fractures, secondary caries or soft tissue pathologies were detected and the restorations were almost undetectable resulting in an aesthetic outlook. In conclusion it is considered that natural looking, functional, tooth-colored, seamless, long lasting and aesthetic restorations can be created by using direct aesthetic composite resins that may satisfy the patients' demands.*

**Key Words:** *Cosmetic Dentistry, dental aesthetic, direct composite resins, crown fractures.*

### INTRODUCTION

Cosmetic dentistry is concerned with the appearance of teeth and the enhancement of a person's smile.<sup>1</sup> Creating natural tooth contours and emergence profiles in aesthetic dentistry is a key challenge in producing a seamless restoration that is harmonious with the adjacent teeth.<sup>1,2</sup> This requires a good eye, a thorough understanding of dental anatomy and a mastery of dental materials. Cosmetic dentistry primarily focuses on improvement dental aesthetics in color, position, shape, size, alignment and overall smile appearance.<sup>1</sup> Technological advancements in natural-looking, tooth-colored dental materials make today's cosmetic dental treatments more

2 durable and predictable than before. Additionally, dentists are now using more conservative aesthetic dentistry techniques to preserve as much of your natural tooth structure as possible, depending upon your specific clinical situation.<sup>3, 4</sup> This makes aesthetic dental procedures such as smile designs more comfortable and convenient for the patients.<sup>1, 3, 5</sup> Direct resin restorations may improve dental outlook if there are excess spaces between the teeth or if they are chipped, broken, stained, or cracked.<sup>4-6</sup> These kind of procedures can be held in a single clinic visit by applying an adhesive system and an aesthetic tooth-colored resin

materials directly to the tooth's surface.<sup>4, 7, 8</sup>

This report describes direct aesthetic approach in treating crown fractures by using composite resins in order to maintain a natural dental outlook.

### CASE REPORT

In this case report an 18-year old male patient with incisal crown fractures on maxillary central incisors applied to the clinic with aesthetic problems. There was cavity free white spot lesions on maxillary left central and right lateral incisors. Because of the patient's negative attitude the white spot lesions were decided not to be treated but to be monitored. Surface grooves, incisal notches and slight deviousness between the central incisors were also detected. The fractured teeth were asymptomatic and according to the anamnesis, they were broken 8 years ago because of an acute trauma. (Figure 1).



**Figure 1:** Incisal crown fractures on teeth #11 and #21

The patient's oral hygiene was in good condition, there was no signs of a periapical lesion in radiographical examinations and also both teeth were vital according to the electrical pulp test. Considering that the patient was young and for a more conservative approach, direct partial aesthetic composite resin restorations for both teeth were decided as the treatment plan.

Firstly, shade selection was considered as A1D and A1E (Clearfil Majesty Es-2 Premium, Kuraray, Japan) by creating composite dots on a tooth and image processing on the photos taken in daylight (Figure 2).



**Figure 2:** Shade selection with "Composite Dots Technique"

The teeth were isolated with rubber dam (OptiDam, Kerr, USA) and gingival barrier (Beyond) (Figure 3).



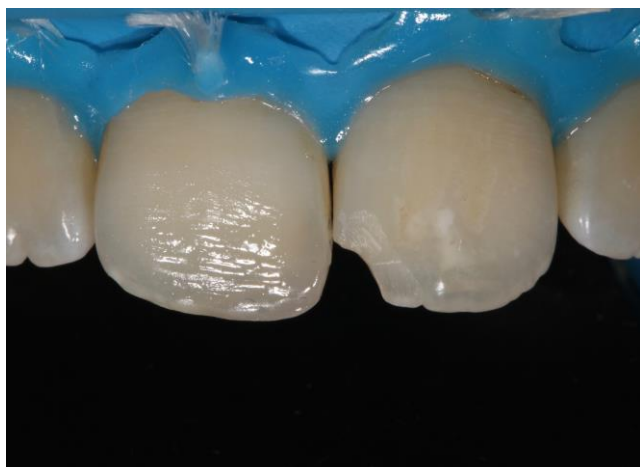
**Figure 3:** Rubber dam and gingival barrier isolation

Irregular bevelings were prepared by using a green-banded diamond burr (Acurata, Japan) on incisal labial enamel. In order to enhance the retention, 37% phosphoric acid (Etching Gel, Kerr, USA) was applied to the enamel surfaces for 15 seconds, washed by water spray and slightly dried by air spray (Figure 4).



**Figure 4: Application of phosphoric acid**

Then a single bottle bonding agent (Adper Single Bond, 3M ESPE, USA) were applied on prepared surfaces and polymerized for 20 seconds with a led light generator with intensity of  $1,000\text{mW}/\text{cm}^2$  from  $\sim 3\text{mm}$  distance to the surface of the restoration (Demi Led Light Curing System, Kerr, USA). A1E transparent shade was applied slightly as first layer and palatal wall. A1D body shade was applied on the first layer leaving  $\sim 1\text{ mm}$  as a more opaque shade (Figure 5).



**Figure 5:** Application of A1D body shade as middle layer

Finally A1E transparent shade was applied as the top labial layer by using a composite brush and composite primer as lubricant (Composite brush, Composite Primer; GC, Japan). While applying the last composite layer the surface grooves, incisal notches for both teeth were simulated by using the brush in order to create a natural outlook. Also the slight deviousness between the teeth was simulated. Each layer was polymerized for 40 seconds. (Figure 6).



**Figure 6:** Surface grooves, incisal notches and deviousness were simulated

Finishing and polishing procedures were achieved by using polishing discs (OptiDisc, Kerr, USA) for contact areas and spiral polishing discs (Twist Dia, Kuraray, Japan) for labial and palatal surfaces with low speed handpiece in dry conditions (DURAtec 2068D, Germany) (Figure 7).



**Figure 7:** Finishing and polishing

Patient was advised not to eat any colorant dietary for 24 hours, motivated for oral hygiene and informed for recalls (Figure 8).



**Figure 8:** Final restorations

At 1-year recall, no fractures, sensitivities, discolorations or secondary caries were detected on the teeth and restorations. The surrounding soft tissues were also healthy. The patient had good oral hygiene and the restorations were almost undetectable as having an aesthetic outlook (Figure 9). Entirely satisfactory restorations were placed in category Alpha (A) according to the Modified USPHS Criterias.<sup>9</sup>





**Figure 9: One-year recall**

In conclusion it is considered that natural looking, functional, tooth-colored, seamless, long lasting and aesthetic restorations can be created by using direct aesthetic composite resins that may satisfy patients' demands.

## DISCUSSION

Creating natural dental outlook in cosmetic dentistry is an important challenge in today's dentistry.<sup>1</sup> Recent advancements in composite resin materials may provide some solutions to some demands such as being aesthetic, economical, functional, long lasting and less time consuming in dental clinic.<sup>3</sup> However there is still no restorative material that fulfills all the demands for now.<sup>2, 10</sup> Dentists now prefer more conservative aesthetic dentistry techniques to preserve more natural tooth structures as possible, making aesthetic dental procedures such as smile make-overs as more convenient treatment options.<sup>3-7</sup> In this regard direct composite resin restorations are one of the best options.<sup>11-13</sup> Single visit application, no need for preliminary models or wax-ups, no need for a technician and therefore laboratory fees that increase the costs, ease of repair and obtaining superior functional and aesthetic results are the main advantages of direct composite resin restorations. They are also kinder to the opposing dentition compared to older feldspathic porcelains.<sup>2, 5, 14</sup> However still many composite materials possess less fractural toughness, shear and compressive strength resulting in not being ideally suitable for high-stress areas.<sup>15-17</sup> Also the main disadvantage of

direct resin restorations can be described as discoloration.<sup>16</sup> But this negativness can be fixed with accurate finishing and polishing procedures and regular recalls.<sup>5</sup> In the presence of some parafunctional habits such as bruxism and nail biting, which may potentially jeopardize the longevity of direct composite restorations which is at the same rate for indirect ceramic alternatives.<sup>16, 17</sup> In this case the shade selection was achieved by using composite dots and image processing of the digital photographs of them. Firstly, photo was changed to black and white in color. Then for enamel shade the light was decreased and for dentin shade light was increased and contrast was decreased. The aim of this technique was to minimize the factors that may effect the objective decision of the shade such as operator making process, daylight ratio and patient's position.<sup>18, 19</sup> In the report presented although it is not a long-term to evaluate, patient at 1-year recall demonstrated no discolorations which is important for the composite resin restorations. Also no sensitivities or fractures were detected at the recalls although the restorations of the crown fractures were complex. Probably the adaptation of Clearfil Majesty Es-2 Premium composite resin (Kuraray, Japan) used in the case was well and carefully performed finishing/polishing procedures by using spiral discs resulted in smooth and sound surfaces. The case selection as having an ideal occlusal pattern could also positively affect the longevity of the restorations located at the critical areas like incisal edges so that creating no devastating forces on the restorations.

In conclusion the case selection is very critical for anterior complex restorations before deciding to use direct composite resins.<sup>5, 15</sup> Cases should be analysed with all details in order to create successful, functional, long lasting, and aesthetic restorations and as well as to satisfy patient's demands.<sup>2, 17</sup> As a result direct composite resin restorations, with accurate case selection, technique, materials and a well-experienced

operator, can yield esthetically satisfying and long lasting results under the conditions of the case presented.

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