

CASE REPORT***Smile Rejuvenation: Case Reports***Shivika Goel¹, Ankur Pandey¹, Nida Haider¹, Prashant Verma¹, Sameer Ahmed Khan¹**Abstract:**

The most common consequence of traumatic dental injury is uncomplicated crown fracture. The main techniques for reconstructing fractured teeth or closing diastemas include the use of direct adhesive restorative materials. However, this type of treatment is time consuming and requires a skilled operator. An alternative to the direct restorative technique is the use of a reference guide. The advantage is that the restorative procedure can be carried out in two short clinical sessions with a drastic reduction in chair time. The size, shape and inclination of the teeth are determined in advance, which reduces the need for eventual adjustments. In addition, the use of a reference guide makes it possible for two or more teeth to be restored simultaneously; in contrast, with the conventional technique.

Keywords: Composite restorations, Dental esthetic, Fracture, Resin

INTRODUCTION

The goal of esthetic and restorative dentistry is the replacement of lost or damaged tooth structures with synthetic materials that possess biological, physical and functional properties that are similar to those of natural teeth. Contemporary composite systems offer a multitude of shades, translucencies, opacities and effects that, together with placement techniques, make it possible to create restorations that faithfully mimic the polychromatic and optical variations that exist in natural teeth.¹⁻³

This evolution of materials, techniques, and concepts allows clinicians to treat a wide range of problems in everyday practice by utilizing direct composite resin restorations in a reliable, predictable, and conservative way.⁴The main techniques for reconstructing fractured teeth include the use of direct adhesive restorative materials. However, this type of treatment is time consuming and requires a

skilled operator who has complete mastery of the restorative materials. This case report offers a step-by-step description of two cases, one restored with a reference guide technique of permanent incisor fractured through trauma and other case of congenitally missing central incisor which is camouflaged by converting lateral incisor to central incisor by reference guide technique.

CASE 1:

A 31 year old male patient reported to the Department of Conservative Dentistry and Endodontics, Kothiwal Dental College and Research Centre, Moradabad. He gave a history of trauma 1 week back and he presented with a traumatic Ellis Class II fracture of tooth 12 (Fig 1). The patient's parents wanted a conservative restorative treatment option to restore the fractured tooth to its original appearance.

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Fig 1 The fractured tooth 12

Clinical examination revealed that 12 had suffered a large Class IV fracture and the fracture line extended into the dentin but did not involve the pulp. The patient reported that the fractured tooth had been “sore to touch” for a few days but was now sensitive only to cold. Radiographic assessments indicated no pulpal involvement or pathology. The patient’s periodontal health was good and no additional fractures were observed in the adjacent dentition. Treatment options were discussed in detail with the patient.

Due to the patient’s age, desire to conserve tooth structure the treatment selected was restoration with a Class IV composite. Because the fracture in 12 was quite large, it was essential to plan ahead for the shape of the final restoration, to avoid compromising the spatial orientation of the composite layers. Study models were taken and used to construct a diagnostic wax-up (Fig 2). A high-viscosity putty index was made from the diagnostic wax-up to aid in assessing the volume of composite material needed for the restoration (Fig 3).



Fig 2 Mock Wax up on model



Fig 3 Rubber based impression as a guide

By incorporating this technique, an appreciation of the spatial relationship could be achieved throughout the restorative process. The restorative material and the matching shade were selected and noted in the patient’s record. During the next session, fit of the constructed mould was checked in the patient’s oral cavity after placement of rubber dam (Fig 4). The palatal portion of the mould fitted perfectly on the palatal aspect of the teeth to be reconstructed and served as a reference guide. The tooth was then etched with 37% phosphoric acid gel (Scotchbond Etchant, 3M ESPE, St. Paul, MN, USA) for 15 seconds and washed with water. The OptiBond S adhesive (Kerr, CA, USA) was applied according to the manufacturer’s specifications. The reference guide was then fitted to the palatal surface of the teeth (Fig 5).

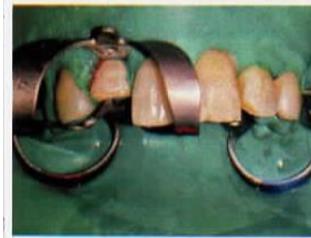


Fig 4 Rubber dam placement



Fig 5 Fit checked into oral cavity

A2 shade restorative material (GC SOLARE Sculpt, Asia) was applied to the palatal portion of the reference guide, and photopolymerisation was applied for 20 s (Fig 6) using QTH light curing unit (Spectrum 800, Dentsply Caulk, Milford, DE, USA) at a light intensity of 600 mW/cm². The same shade was used for restoring the vestibular surface. The final enamel layer was placed and sculpted to proper contours.



Fig 6 Palatal build up using composite resin

Finishing and Polishing

The primary anatomy was developed with a medium-grit diamond bur (Mani, India), followed by finishing burs (Mani, India). The occlusion was checked to ensure that there were no premature contacts. The entire tooth was then polished with Sof-Lex pop-on polishing discs (3M ESPE), using firm pressure to aid the removal of any irregularities and blend the composite with the tooth (Fig 7 and 8).



Fig 7 and 8 Post operative photographs

CASE 2

A 22 year-old female patient reported to the Department of Conservative Dentistry, Endodontics with the chief complaint of an unaesthetic smile. She was concerned about the spacing present in her upper front teeth region (Fig 9). The patient's diagnostic models were made (Fig 10), studied and keeping in mind her basic concerns an initial treatment plan was suggested. She however, was strictly against extraction and a long-term orthodontic therapy. She desired an alternative approach which could address her complaints within a definitive time frame.



Fig 9 Pre operative photograph



Fig 10 Study models

Treatment plan

Considering the patient's requirements and her time constraints an alternative treatment was planned which was to convert upper left lateral incisor to central incisor. Ideal width and length was estimated accordingly to obtain the ideal tooth proportions. With this blue-print, to have a three-dimensional visualization, wax-up was done on the cast (Fig 11). In order to have a more accurate shape, high viscosity putty index was obtained from the final diagnostic wax-up (Fig 12) was sectioned and was positioned against the upper anteriors in the patient's mouth.



Fig 11 Mock Wax up on the study model



Fig 12 Template of putty impression for build up

The palatal portion of the mould fitted perfectly on the palatal aspect of the teeth to be reconstructed and served as a reference guide. The tooth 22 was then etched with 37% phosphoric acid gel (Scotchbond Etchant, 3M ESPE, St. Paul, MN, USA) for 15 s and washed with water. The OptiBond S adhesive (Kerr, CA, USA) was applied according to the manufacturer's specifications.

The reference guide was then fitted to the palatal surface of the teeth. A2 shade restorative material (Filtek Z350 XT 3M ESPE, U.S.A.) was applied to the palatal portion of the reference guide, and photopolymerisation was applied for 20 s using QTH light curing unit (Spectrum 800, Dentsply Caulk, Milford, DE, USA) at a light intensity of 600 mW/cm². The same shade was used for restoring the vestibular surface. The final enamel layer was placed and sculpted to proper contours.

Thereafter, finishing and polishing procedures were performed as described previously (Fig 13).



Fig 13 Post operative photograph

Discussion:

Direct adhesive restorations are frequently used for the reconstruction of uncomplicated crown fractures, as in the case of fracture of the enamel and dentin without pulpal involvement.^{5,6,7} According to Pascal Magne, there are various subjective and objective criteria for the assessment of an ideal smile⁸. Midline symmetry is one such criterion which holds the key to facial aesthetics and smile architecture. In our first case, as the patient did not have fractured dental fragments, reconstruction of the fractured area with composite resin was planned. The restorative technique using reference guide used facilitates the reconstruction of fractured anterior teeth. In the second case during diagnostic wax-up procedure it was realized that estimation of the final width and length of the maxillary anteriors was critical. Lombardi explained the importance of the proportion between width and length in the dimensions of individual teeth and between the respective sizes of anterior teeth⁹. Ideally, width to length ratio should be 80%¹⁰. A higher width/length ratio means squarer tooth and a lower ratio means a longer and slender appearance. A reference guide is created from the teeth (as reconstructed on a model), which makes it possible for the clinician to increase the success rate. The advantage is that the restorative procedure can be carried out in two short clinical sessions, with a drastic reduction in chair time; this factor is important to ensure the patient's cooperation. The size, shape and inclination of the teeth are determined in advance, which reduces the need for eventual adjustments. In addition, the use of a reference guide makes it possible for two or more teeth to be restored simultaneously, in contrast with the conventional technique. Besides functioning as a matrix for reconstructing the anatomy of the teeth, the reference guide functions as a baffle plate to hold the restorative material, facilitating its insertion into the area to be reconstructed. A limitation of the technique is that the impression and cast are needed and progressive mock-up of the fractured teeth must be performed.

Conclusion: Class IV direct composite restorations are an excellent treatment choice for clinicians who are faced with restoring incisal edge fractures of anterior teeth. Here, in the second case it was not possible to recreate the "ideal smile". Considering the extra-ordinary circumstances where the patient

had constraints for time frame and refused for a conventional approach an alternative approach was planned which enabled us to achieve a "balanced smile" that was overall pleasing. Not only is the treatment very conservative in nature, but it also allows the clinician complete control to create a restoration that rivals the best ceramics. This treatment remains one of the greatly valued in dentistry, leading to high levels of patient satisfaction and allowing cosmetic dentists to express their artistic excellence expertise.

REFERENCES

1. Blitz N, Steel C, Willhite C. Diagnosis and Treatment Evaluation in Cosmetic Dentistry. Madison, WI: American Academy of Cosmetic Dentistry (AACD); 2001.
2. Fahl N. Jr. Predictable aesthetic reconstruction of fractured anterior teeth with composite resins. A case report. *Pract Perio Aesthet Dent* 1996; 8(1):17-31.
3. Albers HF. Tooth-Colored Restorations (8th ed.). Santa Rosa, CA: Alto Books; 1996.
4. Terry D. Creating Form and Color: Creativity with Direct Composite Resin [lecture]. Presented at the AACD 18th Annual Scientific Session; Honolulu, HI, May 10, 2002.
5. Traebert J, Almeida IC, Garghetti C, et al. Prevalence, treatment needs, and predisposing factors for traumatic injuries to permanent dentition in 11–13 year old schoolchildren. *Cad Saude Publica* 2004;20:403–10.
6. Andreasen JO, Andreasen FM. Textbook and color atlas of traumatic injuries to the teeth. 3rd edn. Copenhagen: Munksgaard, 1994.
7. Delattre JP, Resmond-Richard F, Allanche C, et al. Dental injuries among schoolchildren aged from 6 to 15, in Rennes (France). *Endod Dent Traumatol* 1995;11:186–8
8. Magne P, Belser U. Bonded porcelain restorations in the anterior dentition – A biomimetic approach. Quintessence publishing co.; 2002. p. 58-9.
9. Lombardi RE. The principles of visual perception and their clinical application to denture esthetics. *J Prosthet Dent*. 1973;29(4):358-82.
10. Gurel G. The science and art of porcelain laminate veneers. New Malden, Surrey, United Kingdom: Quintessence 2003.