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Composite resin restoration: A conservative approach to esthetic dentistry

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Abstract

Composite resins have been advocated for decades as a means to conservatively restore minor, moderate and even large defects in teeth caused by decay or trauma. Their indication is predicated on the need to preserve as much healthy tooth structure as possible while using the synthetic composite resin materials to completely replace and augment lost to its structure by adhesive dentistry. Composite resins are tooth-colored materials that can be applied to the remaining surfaces of teeth to replace lost tooth structure in such a way as to actually make them one, blending and exactly matching the physical characteristics and color of natural teeth, and strengthening them in the process.

Modern composites physically adhere by actually bonding to the two elements that teeth are composed of, dentine and enamel. Major advances have resulted from the study and understanding of how the crowns of teeth actually flex or give under biting force and how restorative materials can be used to the greatest effect in the way they interact. Composites can be used to restore teeth directly—they are applied directly to the teeth in the dental office in a single appointment. These are considerable improvements both from medical/biological aspect as well as social/economic aspect as these newer materials are more conservative and cheaper.

Three cases have been presented in this paper to highlight the advantages of composite resins. The objective of the paper is to show how tooth restoration can be done with minimum tooth preparation.

Keywords: Incisal edge, median diastema, composite resin, cosmetic

Introduction

A sparkling smile is a want of any individual and as a dentist it becomes our prime responsibility to deliver the same. Offcourse, with the present day advancements in material science and techniques, a life changing impact can be made on our patients lives with simple minimum invasive cosmetic dentistry. On the other side, the expectation of our patients continues to rise and it is profoundly important to deliver beautiful and predictable results. It is needless to say at this point of time that we are shifting the gears to minimal prep or no prep dentistry, trying to be as conservative as possible. Composite resin restorations offer a conservative approach to our restorative practice, since the tooth prep is always as minimal as possible. The cases presented in this article are of building up of fractured incisal edge, spacing in both maxillary and mandibular anteriors and median diastema closure using direct composite resin with minimum preparation.

Case-1: A 39 year old female patient reported at Department of Conservative Dentistry and Endodontics of Government Dental College and Hospital, Nagpur, with a complaint of spacing in anterior teeth in both upper and lower region. (figure 1). She was conscious of her appearance as she noticed daily while brushing and her husband too reminded her of spacing every time. The patient demanded minimal preparation as she was scared of the treatment. Study models and photographs were taken and a diagnostic wax mock was conducted to explain the procedure to the patient.

Treatment plan

Two appointments were scheduled for the patient. First appointment for maxillary anteriors and second appointment for mandibular anteriors. First thorough scaling of all teeth.

There was no median diastema in maxillary region. The process was proceeded bilaterally with 11, 12 & 21, 22. Bilaterally enamel surfaces of 11, 12 & 21, 22 were prepared with pumice scrub. The distal surfaces of 11, 21 and mesial surfaces of 12, 22 along with 1mm of facial surfaces of all teeth were etched for 20 sec. Then the etchant was washed away and the surfaces were air-dried. Bonding agent was applied bilaterally and light cured for 40 sec. The accurate shade of composite was placed on the distal surfaces of 11 & 21 and at most care was taken to contour proximogingival extension of the resin. It was cured for 40 sec. The composite resin was applied to the mesial surfaces of 12 & 22 and light cured. In similar manner of above procedure composite resin was added and space was closed bilaterally between 11,12 & 21,22. Then the similar steps were followed to close the spaces between 12,13 & 22,23. Great care was taken for ideal contact establishment and proper interdental form. The finishing and polishing was done using shofu polishing kit and proximal finishing strips. (Figure 2a).

In the second appointment the spacing of lower anteriors were closed. First the median diastema closure 31 & 41 was done. The enamel surfaces of 31 and 41 were prepared with pumice scrub more towards mesial halves of 31 and 41. The mesial surfaces of 31 & 41 along with 1mm of facial surfaces were etched for 20 sec. Then the etchant was washed away and surfaces were air-dried. Bonding agent was applied and light cured for 40 sec. The similar shade that was used in maxillary teeth was placed on mesial side of 31 and care was taken to contour proximogingival extension of the resin. It was cured for 40 sec. Then the composite resin was applied on mesial surface of 41 and was light cured. In this manner the diastema was closed in lower anteriors. Then bilaterally spaces were closed between 31,32 & 41,42. Bilaterally enamel surfaces of 31,32 & 41,42 were prepared with pumice scrub. The distal surfaces of 31,41 and mesial surfaces of 32,42 along with 1 mm of facial surfaces etched for 20 sec. Then the etchant was washed away and air-dried. Bonding agent was applied bilaterally and light cured for 40 sec. The same shade of composite was placed on distal surfaces of 31 & 41 and at most care was taken to contour proximogingival extension of resin. It was cured for 40 sec. The composite resin was then applied on mesial surfaces of 32 & 42 and light cured. In same manner of median diastema closure procedure the spacing between 31,32 & 41,42 was closed bilaterally. Then similar steps were followed to close the spacing between 32,33 & 42,43. Here too great care was taken to establish ideal contact and proper interdental form. The finishing and polishing was done using shofu polishing kit and proximal finishing strips. (figure 2b).



Fig 1: Preoperative



Fig 2(a), 2(b): Postoperative

Case-2: A 45 years old female reported with the complaint of spacing between maxillary central incisors.(figure 3). She was conscious of the appearance of her as her children always reminded her of the spacing and insisted on getting it treated. The patient was quite scared of the treatment and insisted on minimal preparation. Study models and photographs were taken and a diagnostic wax mock was conducted to explain the treatment to the patient.

Treatment plan

After thorough scaling, the enamel surfaces of 11 and 21 were prepared with pumice scrub more towards mesial halves of 11 and 21. The mesial surfaces of 11 and 21 along with 1mm of facial surfaces were etched for 20 sec. then the etchant was washed away and the surfaces were airdried. Bonding agent was applied and light cured for 40 sec. The selected shade of composite was placed on the mesial side of 11 and at most care was taken to contour proximogingival extension of the resin. It was cured for 40 sec. The composite resin was applied to the mesial surface of 21 and light cured. In this way the entire median diastema was closed by adding composite resin first to 11 and then 21. Great care was taken to establish ideal contact and proper interdental form.(figure 4). The finishing and polishing was done using shofu polishing kit and proximal finishing strips.



Fig 3: Preoperative



Fig 4: Postoperative

Case-3: A 40 years old female patient reported with an esthetic complaint regarding fractured maxillary central incisors to Government Dental College and Hospital, Nagpur. (figure 5). The patient's dental history revealed trauma to central incisors. Her oral hygiene was good and both the fractured anterior teeth were asymptomatic and responded within normal limits to cold and electric pulp tests. No periapical lesion or root fracture was diagnosed during radiographic examination.

Treatment plan

A bevel was placed at the incisal edges and was extended to 1mm of periphery on the palatal surface. The enamel was etched with 37% phosphoric acid (Scotch Bond Etchant, 3M ESPE, St Paul, MN, USA) for 15 seconds and rinsed thoroughly with water. Excess water removed with an air syringe. Then bonding agent was applied and cured for 40 seconds. The bonding agent (Tetric-N-Bond Ivoclar Vivadent) was then applied to the prepared surface and light cured for 40 seconds. A thin layer of composite (Tetric-N-Ceram, Ivoclar Vivadent) not more than 1mm in thickness was placed on the right central incisor which covered from facial to lingual preparation. Once the composite preparation was done in accurate and precise position the material was cured for 40 seconds on each surface for 40 seconds. During the restoration the adjacent tooth was isolated with Mylar Strip. Similarly adjacent tooth was built using visible light cure resin. Great care was not to hamper the contour of the tooth and look naturally. (Figure 6). The patient had a beautiful smile.



Fig 5: Preoperative



Fig 6: Postoperative

Discussion

Dental trauma occurs most frequently to central incisors, and fracture zone may involve both enamel and dentine. The current cases offer a conservative, time saving, inexpensive treatment option of a common type of esthetic problem

following dental trauma.

In the first case with no preparation complete spacing between both maxillary and mandibular anteriors were closed. The patient was satisfied completely and we could give her a wonderful smile. In two appointments she had a tremendous change in her esthetics with no fear of any damage or preparation.

In the second case of median diastema closure, with no prep and use of direct composite resin a beautiful smile was given to the patient. The direct composite restoration techniques continued to be popular for restoration of fractured anterior teeth, as it is conservative, less expensive, simpler procedure when compared to prosthetic approach. Despite the tremendous amount of improvements, resin composites still present some shortcomings, such as shrinkage upon curing, discoloration over extended period of time and insufficient fracture resistance of the restoration.

In the third case a simple bevel preparation was done, which improved the etching pattern, causing transverse exposure of enamel prisms and increasing the area available for acid etching. The exposure of subsurface enamel layer is favorable to adhesion, possibly resulting in increased bond strength for the restoration and a better marginal seal. In this case the surface left after reduction was irregular, allowing for restorative material to blend harmoniously with tooth for esthetic reasons. It was made sure that composite resin had enough thickness faciolatally.

Conclusion

Using resin composite for restoration of permanent incisors that have crown fractures is conservative, timely and economical treatment option. The current cases have given good clinical results. It is important to note that the patient related condition of sufficient of remaining tooth structures, excellent oral hygiene and no excessive occlusal forces were optional in these cases.

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