

Aesthetic restoration of anterior teeth using the Putty Index Technique – A Case Report

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Abstract:

Aesthetic restorations of anterior teeth play an important role on the emotional and psychological well-being of the patient. It is important that not only the anatomy is replicated, but also the various shades are placed in proper thickness and position. The main techniques for restoring anterior teeth include the use of direct adhesive restorative materials. However, this type of treatment is time consuming and requires an operator who has complete mastery of the restorative materials. This case report illustrates the use of a putty index technique for the reproduction of palatal anatomy of the teeth which need aesthetic corrections, achieving satisfactory results with lower skill demand.

Key Word: Aesthetic restorations; Anterior teeth; Direct adhesive restorative materials; Putty index technique; Palatal anatomy.

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I. Introduction

Aesthetics is one of the biggest and most common concerns of a patient stepping into a dental clinic. Traumatic injuries to the anterior teeth and diastemas have a fair share in the list of reasons causing aesthetic dissatisfaction. Uncomplicated crown fracture to the permanent teeth has an intense effect not only on the patient's appearance, but also on function and speech.¹ Diastemas, on the other hand, are one of the most common forms of malocclusion and are seen as dark spaces between adjacent teeth that are separated from each other, with no presence of a contact area.² Treatment objectives for anterior tooth fractures may vary depending on the age, socio-economic status of the patient and intraoral status at the time of treatment planning.¹ The predictable aesthetic restoration of broken incisal edge of maxillary central incisors is a demanding and technique sensitive procedure.³ The treatment modalities for restoration of fractured teeth include composite restoration, fixed prosthesis, reattachment of the fracture fragment (if available) followed by post and core supported restorations.⁴ There are various treatment options for aesthetic management of dental spaces like veneers and crowns, but they are invasive and noneconomical.² Direct restoration using composite resins is treatment option which is both non-invasive and economical, and can be used for the aesthetic restoration of uncomplicated anterior tooth fracture as well as diastema closure. The dental composite has emerged as the undisputed champion of all the direct restorative materials.³ However, this type of treatment is time consuming and requires a skilled operator who has complete mastery of the restorative materials.⁵ The use of a silicone putty palatal index helps the clinician overcome these challenges in anterior composite build up. It is an imprint of the wax-up through which required information is transferred into the mouth during treatment.² Advantages with putty index matrix are that exact palatal contour and form can be obtained, even in large defects and can also be used to restore another defect at the same time.^{6,7} The following case report describes the aesthetic restoration of anterior teeth using the putty index technique.

II. Case Report

A 25-year-old male patient reported to the department of Conservative dentistry and Endodontics, Government Dental College and Hospital Aurangabad, with the chief complaint of fractured upper front right tooth and spacing between the upper front teeth and desired to get them restored for aesthetic purposes. The patient gave a history of trauma 6 months back due to a fall from a bicycle. Clinical examination revealed an uncomplicated crown fracture with 21 (Ellis class II fracture) involving only enamel and dentin. Slight distal caries was observed on 11. Spacing was also noted between 11 and 21 (2mm) and between 11 and 12 (1mm) (Figures 1, 2, 3, and 4). The fractured tooth (21) was sensitive to cold with no other associated hard and soft tissue injuries to the surrounding structures. The tooth was not tender on percussion. Vitality of the tooth was checked using an electric pulp tester, on which the tooth gave a normal response when compared to the adjacent and contra-lateral teeth. Radiograph of the concerned tooth did not reveal any significant periapical pathology. Based on all these evaluations, a direct composite restoration was planned using putty index technique. Treatment procedure was explained to the patient and informed consent was taken.



Figure-1 Pre-operative Labial view



Figure-2 Pre-operative Palatal view



Figure-3 Pre-operative Lateral view (right)



Figure-4 Pre-operative Lateral view

In the first appointment, after tray selection, preliminary impressions of the maxillary and mandibular teeth were made using dental alginate (Figures 5 and 6), following which diagnostic casts were obtained. A diagnostic wax up done on the maxillary cast using modeling wax (Figures 7 and 8) and a palatal putty index of the concerned region was created (Figures 9 and 10), and any excess material was trimmed using a scalpel. This will later serve as a reference guide and a rigid template to reconstruct the palatal surface of the concerned teeth.



Figure-5 Maxillary Impression



Figure-6 Mandibular Impression



Figure-7 Diagnostic wax-up on Maxillary cast (labial view)



Figure-8 Diagnostic wax-up on Maxillary cast (palatal view)



Figure-9 Adaptation of Putty on the Palatal Aspect of the diagnostic cast with Wax-up



Figure-10 Palatal Putty Index

In the next appointment, the putty index was checked intraorally for fit. Shade selection was done under natural daylight. Bevels were then given on the labial aspect of the fractured tooth (21) to remove unsupported enamel margin and to increase the surface area (Figures 11 and 12). Distal caries on the right central incisor (11) was removed and the mesial surface of the same tooth (11) and of the right lateral incisor (12) were roughened using a diamond point (Figure 13).



Figure-11 Tooth preparation done with Left Central Incisor (labial aspect)



Figure-12 Tooth preparation done with Left Central Incisor (palatal aspect)



Figure-13 Caries excavation and tooth preparation done with Right Central and Lateral Incisors

After appropriate proper isolation, standard etching and bonding protocols were followed (Figures 14, 15, and 16). The putty index was re-seated in the mouth and re-checked for proper placement. The index was removed and composite material (Dentsply SPECTRUM universal microhybrid composite kit) of the selected shade was placed in the palatal portion of 21 on the index in a thin layer after which it was again placed into the patient's mouth and cured for 30 seconds (Figure 17). The putty index was then carefully removed, leaving behind a rigid layer of composite bonded to the tooth which served as a palatal reference guide (Figure 18).



Figure-14 Etching of the enamel surface



Figure-15 Etching of the enamel surface



Figure-16 Application of bonding agent



Figure-17 Placement of composite material



Figure-18 Rigid layer of composite material acting as Palatal Reference Guide

The tooth was restored by incremental layering of composite material. The same steps were followed for 11 and 12 to facilitate the space closure. The mesial and distal contacts and contours were recreated using mylar strips. Finishing and polishing were done using composite polishing kit and paste (Shofu Inc. Kyoto Japan, Prime Dental Aster Compo respectively) to achieve aesthetically pleasing final restoration and diastema closure (Figures 19 and 20).



Figure-19 Final restoration after finishing and polishing (labial view)



Figure-19 Final restoration after finishing and polishing (labial view)



Figure-21 Pre-Operative Photograph



Figure-22 Post-Operative Photograph

III. Discussion

Direct anterior composite restorative procedures have gained a lot of popularity in the recent years due to their advantages such as immediate aesthetics, minimal invasion, cost effectiveness, adhesion to tooth structure and as a chair side treatment modality.⁷ Direct adhesive restorations are commonly used for the reconstruction of uncomplicated crown fractures, as in the case of fracture of the enamel and dentin without pulpal involvement.⁵ For diastema closure, porcelain veneers and crowns are also one of the treatment options, but in the era of minimal invasive dentistry, a more conservative and economical approach using composite restorative material is preferred.²

In the case presented here, the patient complained of aesthetic concerns due to both uncomplicated crown fracture and diastemas in the anterior tooth region. The patient had three teeth that needed restorations in order to achieve the required aesthetic demand. Composite resin was the material of choice as it provided a conservative option that was both aesthetic and cost-effective, thereby addressing the main concerns of the patient. Another added advantage of these materials compared to other treatment options is that these are non-abrasive toward the opposing dentition, and they have easy reparability in case of fracture.² Direct composite restorations demand high skill and dexterity from the practitioner. It is also a time-consuming technique when multiple teeth are to be restored. Hence, a reference guide technique using a palatal putty index was used to ensure optimal outcome.

The palatal putty index created from the teeth (as reconstructed on a model by wax-up) makes it possible for the clinician to increase the chance of success by planning the procedure in detail. The whole procedure can be carried out in 2 short clinical sessions, with a drastic reduction in chair time.⁵ Besides functioning as a matrix for reconstructing the palatal anatomy of the teeth, it also holds the restorative material, facilitating its insertion into the area to be reconstructed.

Cotton-roll isolation was considered, in place of rubber dam, for this case to facilitate the easy visualization of the midline of the face, so that it coincides with that of the teeth. Moreover, it becomes difficult to adjust the palatal putty index in the exact position with a rubber dam present in the mouth.

The layering of the composite resin was done, subsequently followed by proper finishing and polishing in order to achieve a highly polished surface. The patient was highly satisfied with the aesthetic result. Post-restorative instructions were given, including flossing before tooth brushing regularly and avoiding pigmented liquids, that may cause staining of restoration.

IV. Conclusion

The putty index technique is a simple and economic alternative to direct restorative technique. The putty index perfectly defines the sagittal dimensions, the length, the incisal edge position, the incisal thickness, mesial and distal line angles, and the labial curvature of the desired final restoration.¹ This helps in simplifying the restorative procedure, thereby allowing the clinician to fully concentrate on the application of composite layers. Through this technique, restoration of a single tooth as well as multiple teeth can be done, achieving satisfactory results with a lower demand for practitioner skill and dexterity.

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