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Innovative Modified Putty Index Matrix Technique with Mylar Strip for Enhanced Composite Restorations

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Abstract
Anterior tooth fractures demand precise restorative techniques to achieve ideal aesthetics and function. This article presents an innovative modification of the traditional putty index matrix technique by incorporating a Mylar strip to enhance the accuracy and outcome of composite restorations. The technique was applied in the management of a case involving Ellis Class II fractures in maxillary central incisors. A silicone putty index was fabricated and split to guide both palatal and labial composite build-up. A Mylar strip was strategically placed between the fractured teeth within the putty index to maintain midline symmetry and prevent over-contouring. The method allowed for controlled layering of composite, achieving proper anatomic form, contact, and finish. The final restoration demonstrated excellent aesthetics, patient satisfaction, and no post-operative complications. This modified approach offers a predictable, cost-effective, and minimally invasive solution for restoring fractured anterior teeth and can be employed successfully in varied clinical scenarios.

INTRODUCTION

Composites are one of the most used materials for rehabilitating the anterior aesthetic zone of teeth , so a detailed knowledge on use of this material is mandatory for a dentist.[1] Composite resin restorative materials were developed to overcome the disadvantages of older, less aesthetic restorative materials [2] Composite resins are resins which are reinforced with fillers, so they exhibit high compressive strength, abrasion resistance, ease of application and high translucency. Modifications regarding the filler size and shape have led to formation of various composites have till now.[2]

Traumatic injuries in the anterior teeth region lead to various esthetic and functional problems.[3] Injuries in the anterior region of the teeth commonly causes various complications such as crown fractures which may or may not involve dental pulp. Uncomplicated crown fractures (Ellis class I & II)can be built-up

with direct composite resin using techniques like putty matrix. [3] This technique provides exact palatal anatomy in large defects and can also be used to restore multiple defect such as fracture and diastema at the same time [4] . This case report describes a technique that uses a custom made matrix to replicate the palatal contour and restore the form and function of the teeth using direct tooth colored restorative materials.

Many authors have described technique for placement of composite restorations for anterior teeth with putty index alone or putty index combined with flexible matrix (Polytetrafluoroethylene [PTFE] Teflon tape) [3–10]. The major concerns encountered with use of PTFE Teflon tape or plumber's tape are its difficulty to manipulate around the teeth, many times it gets stuck in the contact area and there is difficulty in its removal after the restorations has been completed, and because of the inability of the teflon tape to be pulled over the labial aspect of tooth structure while curing the composite proper labial contour of restoration is not predictably achieved which can lead to gingival overhang of composites especially when the defect is extending gingival to the height of contour or contact area. So instead of teflon tape, in this case report mylar strip is being used.[1]

CASE REPORT

A 24-year-old male patient reported to the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital Chhatrapati Sambhajinagar, with the chief complaint of fractured upper front teeth and wished to get them restored for aesthetic purposes. The patient gave a history of trauma 8 months back due to a fall from staircase. Clinical examination revealed uncomplicated crown fracture with 11 and 21 (Ellis class II fracture) involving only enamel and dentin (Fig. 1). The fractured teeth (11 and 21) were sensitive to cold with no other associated hard and soft tissue injuries to the surrounding structures. The teeth were not tender on percussion. Vitality of the teeth were checked using an electric pulp tester, on which the they gave a normal response when compared to the adjacent and contra-lateral teeth. Radiograph of the concerned teeth 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.

Fig 1. Pre-operative photograph

A single appointment treatment plan was decided as the patient had requested for the same. A preliminary impression was made using Silicon Impression material (Fig 2). This index was then split in to two halves in the mesio-distal direction to obtain palatal and labial halves respectively (Fig 3). The palatal half was then checked intraorally for the fit (Fig 5), which will later serve as the reference guide and act as a rigid template to reconstruct palatal enamel.3 This impression was modified chairside according to the final

contour which were to be attained at the end of the treatment, in the same appointment (Fig 4) and the palatal fit of the impression was checked again. A modification at this stage from the conventional method is placement of mylar strip in the putty index itself between the two teeth to be built (Fig 6). This modification offer advantages such as maintain the midline contour of both the tooth preventing over-contouring of the composite buid up.

Fig 2. Silicone Impression

Fig 3. Palatal halve after splitting

Fig 4. Modified Index

Fig 5. intraorally for the fit

Fig 6. Mylar strip modification

A long bevel was then given on the labial aspect of teeth to remove unsupported enamel margin and also to increase the surface area. After appropriate shade selection (Fig 7) of the direct composite material. All of the exposed facial and lingual surfaces of the affected teeth were etched using 37% phosphoric acid(Fig 7) for 15 seconds followed by application of bonding agent(Fig 7). Composite material was then placed in the palatal portion of the previously made modified putty index in thin layer of 0.5 mm which was then placed palatally into the patient's mouth and cured for 30 seconds(Fig 8). The matrix was then carefully removed leaving behind a rigid layer of composite bonded to the teeth(Fig 9). The teeth were then restored one by one by subsequently adding composite superficial to this rigid palatal composite layer (Fig 10). Occlusion was checked and necessary adjustment were made following which finishing polishing was performed using polishing discs.

Fig 7. Shade selection(A2) ; etching using 37% phosphoric acid ; application of bonding agent

Fig 8. 0.5 mm Composite layer

Fig 9. Rigid layer of composite bonded to the teeth

Fig 10. Composite Build-up

Interproximal finishing was accomplished using finishing strips. The patient was given oral hygiene instruction on how to take care of his restorations

DISCUSSION

Dental tissue loss due to trauma has various impacts such as loss of function, esthetics and psychological problems.[3] In case of uncomplicated crown fractures, direct adhesive resin restoratives serve as cost effective and a chairside treatment modality. With the advancing technology and improvements in the bonding systems there is increased success rate of such restorations even further. [5] Management of anterior teeth fracture is a great challenge for clinician from esthetic point of view.[6] Considering the requirement and age of patient, in this case, a direct restoration was planned using putty matrix technique.

Pre – operative

Post – operative

Advantages of this technique of combining both rigid and flexible matrices for restoring defects are,

1. Rigid matrix when used for restoring the palatal surface gives desired contour and length/extension of incisal edge, which in turn can guide and support the labial surface composite build up. And versatility of this technique it can also aid in moisture control for palatal surface.

2. Flexible matrix mylar strip placement prevents composite from adhering onto adjacent tooth, and when using in labial surface build up helps in achieving the desired esthetic anatomic contour and excellent labial surface finish.
3. Can be used even in difficult cases like, multiple teeth restorations, crowded teeth, and extensive defect restorations. Limitations of this technique will be, restorations might necessitate the practice of four handed dentistry, as operator will require to manipulate and place both mylar strip and putty index together at same instance.

CONCLUSION

The matrix technique described here combines advantages of both flexible and rigid matrix in anterior composite restorations to re-establish form and contour of tooth structure.[1] This technique is a quick, simple and cost-effective method in comparison to other invasive esthetic procedures.[3] The technique in this article is a promising one and can be utilized for varied clinical scenarios both in single tooth or multiple teeth management.

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