Esthetic Restorations, The Putty Matrix Technique

Arshad Hasan and Omer Shahid

ABSTRACT

The predictable esthetic restoration of broken incisal edge of maxillary central incisors is a demanding and technique sensitive procedure. Its success is dependent on operator's skills and knowledge and also on adhering to a systematic and problem solving approach. It is important that not only the anatomy is replicated, also the various shades are placed in accurate thickness and position. This perfect blend of accurately placed shades gives the most natural and esthetic outcome. The current report is about esthetic restorations in adjacent maxillary central incisors using a lingual matrix. A systematic and problem solving approach made possible an esthetic outcome of the case and resulted in an extremely satisfied patient.

Key words: Putty matrix, composite restoration, esthetic restoration.

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INTRODUCTION

Predictable esthetic restoration of a maxillary central incisor demands discipline in terms of adherence to protocols.[1] This procedure can become a nightmare for the practitioner and can result in un-necessary provision of an indirect restoration. However, if one can follow a simple protocol, the esthetic restoration of a central incisor can be one of the most enjoyable and fulfilling experience for both the practitioner and patient.

The part of predictability of procedure owes to the advancement in the composite chemistry. The dental composite has emerged as the undisputed champion of all the direct restorative materials.[2] Ever since its introduction to dentistry, the chemistry has continued to evolve and has resulted in improvements in bonding, handling and optical properties. Longevity studies also report a comparable performance of dental composites even in most demanding situations.[3-5]

The present report will describe a systematic and troubleshooting approach to rebuild the lost anatomy of a maxillary central incisor. A putty matrix technique was used in the case which is extensively described in the literature.[6-8] The step by step procedure explained in the following case represents the systemic approach routinely used by the author for class 4 buildups. Case Description:

A healthy, 42 year old male patient presented with fractured mesioincisal edges of teeth no 11 and 21(FDI) (fig 1). There was no pain, sensitivity or swelling associated with the teeth. All examination findings were within normal limit, except for the color (fig 2) and vitality testing of tooth 21 which did not respond to cold testing. Radiographically tooth 11 was with in normal limits, however tooth 21 has a radiopacity in the pulp space. Hence a diagnosis of calcific metamorphosis was made. Patient was given options of indirect or direct restoration. The patient consented for a direct restoration due to financial constraints.

A diagnostic impression was made with alginate and a study model was fabricated with dental stone. A diagnostic waxup was performed with inlay wax and a putty index (3M, Seefeld Germany) was created (fig 3). At the subsequent restorative appointment, vita shade guide was used to match the shade. The shade A3 was selected for cervical area and A2 for the mid facial area. Shade A1 was selected to replace the incisal third (fig 4). Local anesthesia was administered and a medium gauge rubber dam (Hygenic Dental Dam, Ohio USA) was placed. The putty matrix was checked for fit and necessary adjustments were made. Tooth no. 11 was restored first. Two bevels were placed. First bevel was a steep one at around 45° to the facial surface. Second bevel was a shallow infinite bevel extending to the cervical third (fig 5). Adjacent teeth

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were isolated with cellophane strip and all of the exposed facial surface and lingual surface was etched using a 37% phosphoric acid for 30 seconds and rinsed and dried. A 7th generation bonding agent (3M, Seefeld Germany) was applied for 20 seconds and was air was blown gently followed by light curing for 30 seconds using an LED light unit (3M, Seefeld Germany). This was followed by placement of restorative material.

The composite restorative material (Dentsply Detrey, Konstanz Germany) was used incrementally. A1 shade was adapted to the putty matrix in a thin layer slightly beyond the fracture line. The matrix was carefully seated to tooth 11 and light cured (fig 6). Upon removal of the matrix, the cured composite remained bonded to tooth and represented the lingual contour of the proposed restoration. Shade A2 was used in the mid facial area and was shaped into three lobes of dentin to mimic the natural anatomy(fig 7). They were purposely left short of the incisal edge. After being light cured the proximal contact areas were restored using shade A1. Last increment was again A1 shade used for the remaining entire facial surface and light cured. Soflex disks (3M, Seefeld Germany) coarse and medium were used to develop initial macro anatomy (fig 8).

Tooth no. 21 was restored next. A butterfly clamp was placed to push the rubber dam cervically and expose full facial surface. A similar steep bevel was followed by an infinite bevel which involved all of the facial enamel. After etching and bonding, A1 shade was used with the putty matrix to reproduce the lingual contour of the tooth (fig 9). Shade A2 restorative composite (Ceram X Mono Plus, Dentsply Detrey Konstanz) was used to develop dentinal lobes. The proximal contact areas were developed next with the A1 shade. Last increment was in the form of a facial veneer of shade A1 and was used to cover the entire facial surface (fig 10). Each increment as light cured with an LED light curing device. Soflex disks coarse and medium were used to develop the initial macro anatomy (fig 11).

The finishing and polishing was performed at the subsequent visit, a week later. Finishing at the proximal margins was accomplished with the finishing strips (fig 12). Next the facial surface was marked with a pencil to identify the transitional line angles and anatomical lobes. A 12 fluted tungsten carbide (Dentsply, Konstanz Germany) was used to develop the marked facial anatomy and enhance the transitional line angles (fig 13). The last step of polishing was the use of a polishing paste (Dentsply, Konstanz Germany) with polishing cups to generate a highly polished surface (fig 14). The patient was instructed about oral hygiene and care of his restoration and was subsequently discharged.

Fig 1, Pre-operative frontal view

Fig 2, close up

Fig 3, putty matrix on waxed up stone model

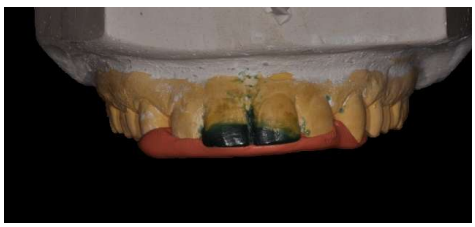

Fig 4, shade matching

Fig 5, two level bevel on tooth 11

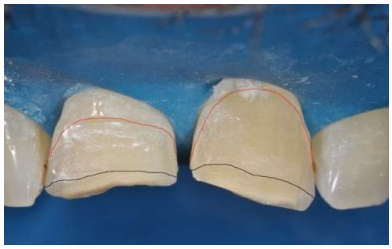

Fig 6, first increment lingually with shade A1

Fig 7, dentin lobes with shade A2

Fig 8, Completed restoration of 11, lingual shelf of 12

Fig 9, Initial facial increment

Fig 10, final labial veneer of shade A1

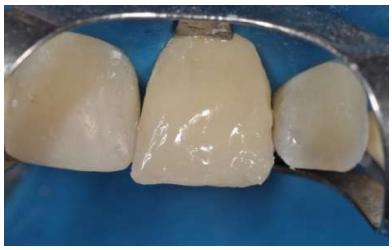

Fig 11, Use of soflex for initial anatomy

Fig 12, Finishing strip

Fig 13, 12 bladed tungsten carbide bur

Fig 14, final polishing paste for high lusture

Fig 15, post-operative view

DISCUSSION

Composite restorations offer a cost effective treatment alternative where esthetics is a major concern. The survival rates of these anterior composites were reported to be extremely satisfactory even in patients with worn dentition.[9] With improvements in the bonding chemistry and introduction of nano-composites, it is speculated that the success rate of composites will improve even further.

In our case study a discolored tooth that did not respond to vitality was not endodontically treated and was veneered instead. The pulp survival rate of such teeth with calcific metamorphosis and radiographically normal periapex is 84% at 20 years followup.[10] A lingual matrix technique was used which has been reported previously.[7] The benefits of this matrix are a creation of lingual contour which minimizes later adjustments for occlusion, incisal edge determination to enable precise placement of dentin and enamel shades, incisal thickness determination to allow the placement of translucent shade, placement of final facial increment in single increment. In authors opinion this last benefit offers a huge advantage. If the facial surface is restored in multiple increments, there is a possibility of gaps between the increments. Some initial facial anatomy can also be carved into the facial aspect of restoration before curing which will reduce the time spent on finishing and polishing.

A two step bevel was used in the current report. First bevel was a steep one while the second bevel was quiet shallow and extended to the cervical third. The width of the first bevel was 2mm since this width exposes enough enamel rod ends to make the bonding long lasting.[11] The layering of various shades followed a distinct sequence. The A1 shade was used to replace enamel. Enamel, in a human tooth provides value and hence Shade A1 with high value was used to substitute enamel. Similarly, the use of A2 shade which is more chromatic, provided an acceptable substitute to replace the mid third of the crown where a greater chromaticity was required. The A1 shade was used to veneer the discolored tooth # 21. However, after polishing and finishing, the discoloration remained but did not become an esthetic failure due to a low lip line. Lastly, the composite finishing and polishing protocol enabled a highly polished surface and resulted in a satisfied patient.

CONCLUSION

The acceptable esthetic outcome of a class 4 composite restoration depends on adherence to a systematic approach outlined in the clinical technique. The improvement in physical and chemical properties of dental composites has made possible extremely esthetic and long lasting restorations. A clinician with any level of experience can use this systematic approach and achieve great results.

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