

A 26-year-old female with faulty existing restorations

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Article Info

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Received: 14 March 2021
Accepted: 1 April 2021
Available Online: 4 April 2021

ISSN: 2224-7750 (Online)
2074-2908 (Print)

DOI: 10.3329/bsmmuj.v14i2.52438

Cite this article:

Yadav RU, Ahmed S, Hossain M. A 26-year-old female with faulty existing restorations. *Bangabandhu Sheikh Mujib Med Univ J.* 2021; 14: 27-30.

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A Journal of Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh



Presentation of Case

Dr. Ram Udgar Yadav (MS Resident): A 26-year-old female came with unaesthetic restorations on the upper four anterior teeth. She gave a history of the restoration of the teeth 6 months ago that underwent progressive marginal discoloration. On clinical examination, two upper central and two lateral incisor teeth were restored by Glass Ionomer cement and Secondary caries were present beneath restorations (Figure 1-A). Teeth were vital and did not respond to percussion and mobility test.

Dr. Yadav: Radiographic examination revealed that the four maxillary anterior teeth (2 central and 2 laterals) had the existing restoration which showed a radioopaque area in the proximal surface but radiolucent areas were also seen beneath the radioopaque area that extends to the dentin. However, there was no involvement of the pulp and periodontal tissues.

Provisional Diagnosis

Marginal discoloration of existing restorations

Differential Diagnosis

Pulp necrosis

Dr. Sageer Ahmed (MS Resident): Pulp necrosis is found without any painful symptoms.^{1, 2} Discoloration of the tooth is the first symptom of pulp death.^{3, 4} In some cases, the patient may give the history of severe pain which last for a few min to hours and then it stops with sudden and complete cessation of pain.^{5, 6} It progresses slowly and silently, but the patient is unaware of symptoms.⁷ Radiograph shows no change of periapical tissue. As such signs and symptoms were absent in the present case, it was excluded from the diagnosis.

Dental fluorosis

Dr Ahmed: Dental fluorosis mainly occurs on both sides and presents with a white band across the tooth surface.^{8, 9} The lesion can be seen to a few teeth or can include the full

dentition. The lesions are present in the enamel and can vary from deep to superficial based on the severity of the fluorosis. The patient may give a history of prolonged exposure to fluoride intake. Since chalky white doesn't appear on the overall tooth surface and there was no history of fluoride exposure, it was excluded from the diagnosis.

Rampant caries

Dr. Ahmed: Rampant caries is characterized by severe involvement of all the permanent teeth except the mandibular incisor and mandibular canine.^{10, 11} It is usually present in the adolescent age group and gives history of excess sugar intake. Poor oral hygiene is also present. Since there was the involvement of only maxillary incisors and therefore, it was excluded from the diagnosis.

Dr. Yadav's Diagnosis

Secondary caries

Treatment Procedure

Dr. Yadav: The affected teeth were planned to restore with composite by layering technique. Alginate impressions of maxillary and Mandibular arches were made, to make casts. Shade selection was performed first by placing composite buttons (Figure 1-B). The enamel and Dentine shades selected were A1 and A2 respectively. Thereafter, oral prophylaxis was performed. A rubber dam was placed and floss was tied to complete isolation and expose Cavo-surface gingival margins. Existing restorations were completely removed. Natural teeth were preserved as much as possible (Figure 1-C). Beveling of margins was done with red-coded fissure bur. A Teflon strip was placed on an adjacent tooth structure. Tooth #11, #12, #21, #22 was etched for 15 seconds with 37% Phosphoric acid. The etchant was removed by spraying water for 30 seconds. Silicon index was made with Addition silicon. A 7th generation adhesive system was placed in the cavity and beveled margins. It was air thinned and polymerized for 20 seconds. With the help

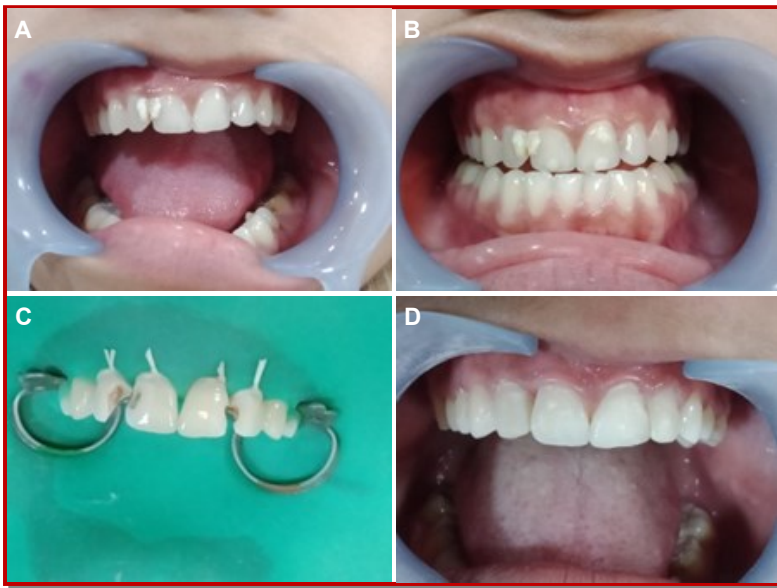


Figure 1. The preoperative view showed existing restorations in maxillary incisor teeth which are considered to be esthetically unpleasant (A); shade selection was performed by placing the composite buttons on the labial surface of the teeth (B), a rubber dam isolation was performed to keep the surface dry and avoid moisture contamination (C); final restoration showed excellent color match and marginal adaptation (D)

of silicon index, a lost palatal wall was built on tooth #11, #12, #21, and #22. Enamel shade was used here. Then, the proximal wall was built with the help of a sectional matrix using enamel shade. Dentine layer (A2) composite was used in the cervical area and middle third area in wedge-shaped increments and light-cured each increment. An enamel layer was then applied as the final layer on the facial surface and light-cured. Final curing was done under glycerin. The patient was recalled after 24 hours and finishing was started. Gross finishing was done with red-coded fissure diamond bur along with a coarse disc (3M, USA). Pre-polishing with the help of a rubber cup and magic mix (Bioclear, USA). Final polishing was done with a Rockstar polisher (Figure 1-D).

Discussion

Regarding restoration technique

Direct composite restoration has good clinical performance, and its use in the clinic should be performed according to the treatment plan as mentioned in different literature.^{12,13} Type of composite resin, methods, and the operative procedure (beveling of enamel margin, rubber dam application) should be considered for the success and longevity of this treatment.^{14,15} Therefore, special care should be taken in direct composite restoration. Moreover, the size and form of the maxillary anterior teeth are also important to establish facial esthetics and favorable

occlusion.^{16,17} To achieve a good esthetic and contour, casts restoration with occlusal guides, as well as diagnostic wax is recommended by some of the previous studies. Silicon or alginate impression is favorable to prepare a cast because it can transfer anatomical details of shape and texture present in the wax and creating a shelf on which composite can be layered in a controlled manner.^{18,19}

It will not only facilitate the operative procedure but also improve the properties of composite resin. Moreover, the planning of the work and using silicon index leads to fewer errors. This ensures greater predictability of the case and can add security to professionals and patients regarding treatment. Therefore, in the present case, the cast restoration technique was performed to increase the longevity for restoration.

Regarding restoration material

Many previous studies have confirmed a high success rate for direct restorations with composite resin; 95% success rate for restorations of class III and 90% for Class IV restorations after 10 years have been observed.^{20,21} To improve its success rate, nanohybrid composites have been developed by using nanoparticles and pre-polymerized resin fillers, similar to those found in the microfill composites, and have named this group "nanohybrids."^{22,23} It is also supplied in a variety of different colors and considered as a better esthetic restoration. Furthermore, due to its higher strength and polishability, its use in anterior and posterior applications has been expected.^{24,25}

Other factors are associated with achieving natural aesthetics. Among them, the choice of material with good optical properties, mixing of colors of composite plays an important role. However, it is often difficult to reproducing dental tissues naturally because dentin has a chromatic translucency, and its saturation increasing over time.^{26,27} On the other hand, enamel present with either chromatic or achromatic translucency.^{28,29} Furthermore, as the enamel and dentin composite resin have different compositions, the choice of material and pigment is very important, and the color perception of the dentin composite resin is determined by the enamel composite resin selected.^{30,31}

It is also important to repair the existing restoration other than replacement. The repair of composite resin has been investigated in formal studies.³²⁻³⁴ A study showed that the performance of repaired restorations was similar to restorations that have been replaced, over the 10 to 12 years which is originally based on the marginal adaptation, secondary caries, and anatomy.^{33,34} When clinically indicated, repair of the composite should be the treatment of choice. In this case, existing restorations were replaced due to marginal discoloration, lack of color similarity, and improper marginal adaptation.

Final Diagnosis

Secondary caries due to defective restoration

Follow-up

When the patient was called after 7 days following completion of treatment, the restoration margin was intact and there was no increase in the size of the lesion.

Dr. Sah (MS Student): What are methods that we can adopt to increase longevity in such aesthetic restorations?

Dr. Yadav: Proper excavation of caries, good isolation to prevent micro-leakage, marginal finishing of the cavity, proper condensation, adequate curing, polishing of restoration at regular intervals, and patient motivation to maintain oral hygiene are important factors for increasing longevity of such restoration.

Dr. Ahmed: What is an alternative technique to the traditional rubber dam?

Dr. Yadav: Handi dam, insti dam, optra dam, isolite are the alternatives to traditional rubber dam.

Conflict of Interest

Authors declare no conflict of interest

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