

# Aesthetic restoration challenges using the stratification technique



**Buzatu R.<sup>1</sup>, Bolos C.O.<sup>1</sup>, Valceanu A.S.<sup>1</sup>, Delvecchio A.<sup>2</sup>, Luca M.<sup>3</sup>, Dinu S.<sup>3</sup>, Craciunescu E.L.<sup>4</sup>**

<sup>1</sup>Department of Dento-Facial Aesthetics, Faculty of Dental Medicine "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania

<sup>2</sup>student of Dental Medicine "Victor Babes" University of Medicine and Pharmacy, Timisoara, Romania

<sup>3</sup>Department of Pediatric Dentistry, Faculty of Dental Medicine, "Victor Babes" University of Medicine and Pharmacy, Timisoara

<sup>4</sup>Discipline of Propaedeutics and Dental Materials, Faculty of Dental Medicine, UMF Victor Babes, Timisoara, Romania

Correspondence to:

Name: Dinu Stefania

Address: p-ta Eftimie Murgu nr.2, Timisoara, Romania

Phone: +40 723224768

E-mail address: dinu.stefania@umft.ro

## Abstract

**Aim and objectives:** To describe a resin layering and stamp restorative technique based on the biomimetic concept to improve esthetics in a patient with dental defects that affected both enamel and dentin in posterior teeth.

**Material and methods:** The patient, a 23-year-old girl, presented to the doctor with blackish staining on the teeth in the posterior side and no complaints of discomfort. She needs odontotherapy treatment on the mandible in multiple teeth on the posterior side by using the layering technique.

**Results:** The layering technique for posterior teeth can reproduce the aspects of a natural tooth, like its different opacities, shades, and translucencies of enamel/dentin, which can be individualized during buildup in an attempt to match with natural structures, and reduction of the shrinkage stress generated by the polymerization contraction.

**Conclusion:** An important advantage of the incremental layering technique is the possibility to reproduce the aspects of a natural tooth, such as its different opacities, shades, and translucencies of enamel/dentin, which can be individualized during buildup in an attempt to match with natural structures.

**Keywords:** stratification, aesthetic, posterior, resin

## INTRODUCTION

In the last 20/25 years, it changes the way how to treat dental decay, especially for the needs of the patients even for the aesthetics and toxicity demands that other material could give. For this, it was developed new material and method for the aesthetic restoration in the posterior side that is in continuous evolution. We can restore small or wide lesions with adhesive techniques

Composites can be used on almost any tooth surface. That is why these products are increasingly being used to enhance their performance to adhere to the tooth structure (enamel and dentin) as well as their physical and mechanical characteristics. (1)

The indications for direct posterior composites should be clear and correct enough, and criteria must be respected in all steps because they are very technique-sensitive and if you don't pay attention to the details may result in failures in the future. (2)

The LT is highly desirable in order to decrease the problems generated by resin composite polymerization shrinkage. The insertion of a layer of composite is supported by the principle of C-factor reduction, which is characterized by the number of bonded walls branched by the number of free surfaces. By using an incremental layering technique, the resin composite is bonded to a decreased number of cavity walls that decreases the C-factor, and this is reducing its shrinkage levels. However, the clinical steps become highly sensitive to the clinician for the manipulation, and the final functional and esthetic result may also be compromised. An important benefit of working in increments is the possibility to reproduce different opacities, shades, and translucency characteristics of enamel and dentin, which can be customized during the buildup. The filling technique for posterior teeth should guarantee a correct adaptation of composite, especially to cavity margins, appropriate reconstruction of anatomy, and reduction of the inherent shrinkage stress achieved by the polymerization contraction.

The American Dental Association (ADA) published in 1998 the recommended indication for direct posterior restoration: Preventive restoration by sealing grooves and fosses; Treatment of cavity class I and II of small-medium dimensions; Cavity class V; Treatment of cracked teeth; Patients with allergies to alloys. (3,4,5)

## MATERIAL AND METHODS

The selection of patients was taking into consideration to have superior or inferior molars with the decay on the occlusal surface, with stable, simultaneous occlusal contacts, good occlusal morphology, no smokers, young patient and without periodontal issue.

On the other hand, we excluded patients with the following criteria:

Poor oral hygiene, smokers, periodontal problems, bruxism, and mental disabilities

The materials utilized for this techniques was Estelite Asteria

The patient, a 23-year-old girl, presented to the doctor with blackish staining on the teeth in the posterior side and no complaints of discomfort. She needs odontotherapy treatment on the mandible in multiple teeth on the posterior side by using the layering technique. The patient filed a medical chart, and it was informed about the undergoing study

After cavity preparation, selective etching of the enamel with 37% phosphoric acid for 30 seconds is done, then rinse and gentle drying is obtained to eliminate traces of moisture from the dam and adjacent teeth, but without directing the air jet directly into the cavity, avoiding dehydration. After etching and before the bonding, the application of a 0.2- 2% chlorhexidine solution was applied, then bonding application with Tokuyama EE Bond, and gentle drying for 5-10 seconds, the surface should appear shiny, and the bonding polymerization for 30 seconds is done. Then an elastic flow composite on the cavity base in a thin layer and its polymerization was performed.

The A 3.5B Estelite Asteria composite was used to fill the bottom part of the cavity, and create the interproximal grooves where it was applied Dark Brown pigmentation (Estelite Color), leaving space for the last layer of the material (Figure 1,2).



Figure 1. Bonded Surface



Figure 2. First layer of composite A3,5B Estelite Asteria Tokuyama dental

In general, it should be done horizontal layering in narrow and deep cavities and direct polymerization, in oblique layering the polymerization through the cusp walls in larger cavities. After, the anatomical layering in several increments with modeling the grooves and cusp slopes is made.

The last incremental layer with OcE composite was applied (Estelite Asteria Tokuyama dental) with the anatomical characterization of grooves and fossettes (Figure.3)

and the polymerization of the various increments was done. In the end Polishing with medium-grain rubber pads, removal of the dam, and verification of occlusal contacts were performed (Figure.4).

In the Figure 5 we can observe the final aspect.



Figure 3. Last layer of composite



Figure 4. Polishing and verification of the occlusal contacts



Figure 5. Final aspect

## RESULTS

The layering technique for posterior teeth can reproduce the aspects of a natural tooth, like its different opacities, shades, and translucencies of enamel/dentin, which can be individualized during buildup in an attempt to match with natural structures., and reduction of the shrinkage stress generated by the polymerization contraction.

Precision is needed for each clinical step and high importance must be given to materials that become highly sensitive during handling.

## DISCUSSIONS

The layering technique was established and adapt to the evolution of functional and anatomic restoration applying the esthetic with composite restorative materials that include shades of dentin, enamel and also various translucencies and intensive colors.

This technique is designed to embed various degrees of chroma present in a tooth.

It entails using a higher chroma composite resin in the center of the preparation and a lower chroma resin adjacent to the cusp walls. (6)

The performance of the incremental filling technique is questionable. Versluis et al. demonstrate that additional increments by the incremental filling technique can produce higher shrinkage stresses at the adhesive interface and increase the cuspal deformation of the weakened cusps. (7)

Campononico et al. says that the incremental layering technique is a time-consuming procedure, may increase the contamination risk, and has voids in the restoration.

On the other hand, a recent in vitro study directed by Bicalho et al. stated that the harmful consequences effects of residual shrinkage stresses could be reduced by using a low fluid shrinkage composite and increments that are not exceeding 2-mm thickness.

Hirata et al. says that the insertion of a layer of composite is supported by the rationale of C- factor reduction, which is defined by the number of bonded walls divided by the number of free surfaces. Adopting an incremental layering technique, the resin composite is

bonded to a reduced number of cavity walls that decreases the C-factor thus reducing its shrinkage levels. (8)

Furthermore, the therapeutic measures become very vulnerable to operator handling, potentially jeopardizing the final functioning and esthetic outcome.

Consequently, the filling technique for posterior teeth should maintain a correct adaptation of composite, especially to cavity margins, proper reconstruction of anatomy, and reduction of the inherent shrinkage stress generated by the polymerization contraction.

An important advantage of the incremental layering technique is the possibility to reproduce the aspects of a natural tooth, such as its different opacities, shades, and translucencies of enamel/dentin, which can be individualized during buildup in an attempt to match with natural structures. (9,10,11-16)

## CONCLUSIONS

The decision of these technique that have been used depends on the desired aesthetic patients complaint (although results seem very acceptable for these technique), the time available for the operative steps, and the clinician's experiences with the technique and material, or even depending on each clinical case, if it is involved just the enamel or enamel/dentine.

Although the techniques is sustained by scientific evidence, there seems to be a trend toward simplification of steps, benefits being less treatment time and reduced polymerization contraction stress.

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