

## STRATIFICATION TECHNIQUE IN MAXILLARY ANTERIOR INCISORS RESTORATION

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### ABSTRACT:

**Background:** Because of their main characteristics: transparency, opalescence and color density, the tooth structures are extremely difficult to restore by means of completely inconspicuous restorations of the natural tooth tissue characteristics.

**The aim** is to show successful aesthetic restoration of III Class dental lesions in upper incisors by means of high quality composites.

**Materials and method:** A female patient visited the clinic being not satisfied with the esthetics of her front teeth. The intraoral examination showed previous restorations and carious lesions in 12, 11, 21, 22. After defining the tooth color a silicone key was made. The treatment was performed under anesthesia, the existing restorations were removed and the carious lesions in teeth 11, 12, 21, 22 were treated with restorations using Vanini edge preparation. The teeth were restored by means of stratification technique. After etching and rinsing, bonding was applied for 20 sec. and then polymerized. After fixing the silicone key enamel shade was applied and then dentine shades UD2, UD3, UD4 of 0.5mm thickness each. The polymerization was done layer by layer. Applied were 10 to 15 layers in total. The composite material was preheated in oven up to 55. Teeth 21 and 22 are restored with Enamel Plus HRi (Micerium).

**Results and Discussion:** Excellent aesthetics is achieved with composite material. They have enamel and dentine shades and allow high quality aesthetics. The polishing is excellent in Enamel Plus HRi (Micerium) which is typical for this type of composite. The result of the carious lesion treatment in this patient is real improvement of the dental appearance of her anterior incisors.

**Conclusion:** Materials show excellent aesthetic results due to their characteristics and the stratification technique used.

**Key words:** stratification technique, composite restoration, dental esthetics.

Hard dental tissues are difficult to restore to the point of achieving restorations of uniform colour and characteristics. This is due to the unique structure of the enamel and dentine. For example dentine is responsible for the fluorescence of teeth while enamel rod structure is a reason for transparency and opalescence of the tooth. The filling of caries and non caries diseases of dental hard tissues through composite material from one shade restores the integrity of the dental hard tissues but there is a lack of transparency, fluorescence and opacity of the filled tooth.

The quality of final filling is no match of the natural characteristics of enamel and dentine [3, 5, 8]. The research of dental hard tissue restoration methods of qualities closer to the natural ones led to the creation of a new branch in dental medicine: cosmetic dentistry [1, 4, 10]. The aim is to restore enamel and dentine to preserve the beauty of smile, colour harmony and lifelike dental esthetic. The stratification technique described by L. Vanini [8, 9] is one of the esthetic restoration methods.

The aim of this presentation is to show case an esthetic restoration of third class caries lesions of maxillary incisors through stratification techniques.

### Materials and methods

A 27-year-old female patient with frontal teeth 12, 11, 21 (figure 1) restorations made five years ago. The restorations had no esthetic look, colouring around the edges, and some had secondary caries. The patient is trying to hide her teeth during conversation, avoids smiling and opening her mouth too much.





**Fig. 1.** Disagreeable fillings in the upper left, right central and lateral incisors: a, b – labial view; c – palatal left view.

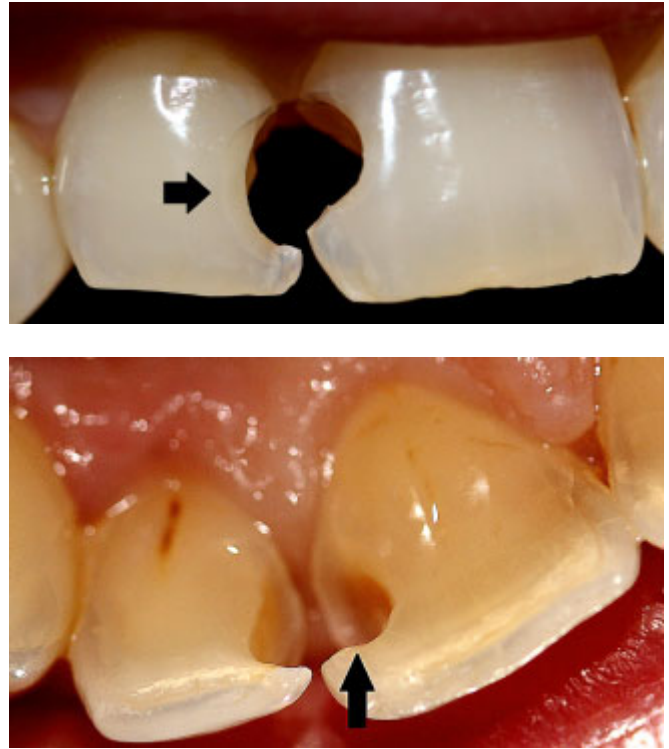
The patient was offered an exchange of existing fillings with layering technique fillings to achieve a c esthetic result. Treatment was carried out in two visits. During the first visit, silicon A (Variotime, monophasic key was taken of her upper anterior incisors (Hereus, Kulzer). The impression was formed by cutting and was used as a matrix for composite material layering (figure 2). The vestibular surface was taken away while leaving the palatal surface of teeth 12, 11, 21, 22 and the incisal edge (figure 2b).



**Fig. 2.** The impression is an essential element of the stratification technique: a – immediately after being taken;

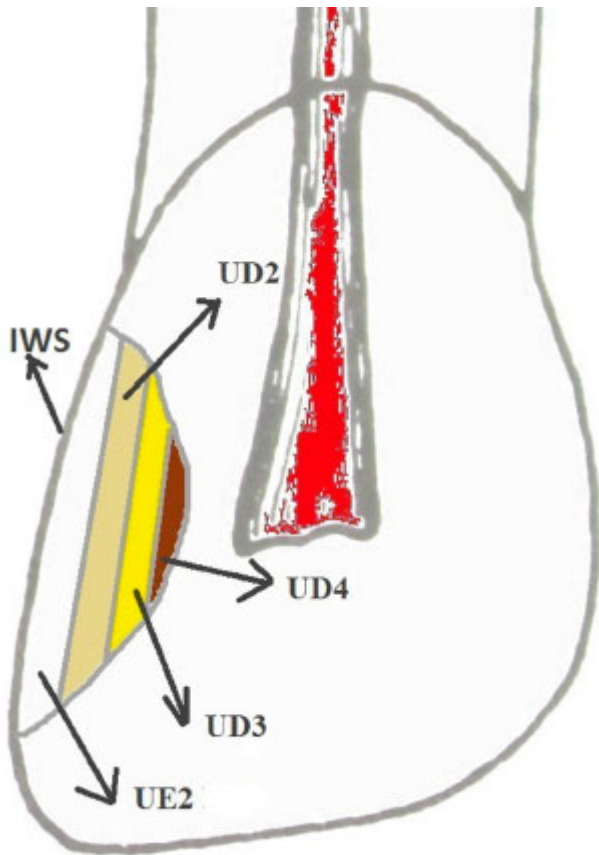
b – after processing.

During the second visit, the existing fillings medially in 12 and 22 and distally in 11 and 21 were removed. The preparation of cavity edges was performed after the method of L. Vanini [9] – at 90° butt margin for the palate margin and at chamfer (supported walls) for vestibular margin (figure 3).



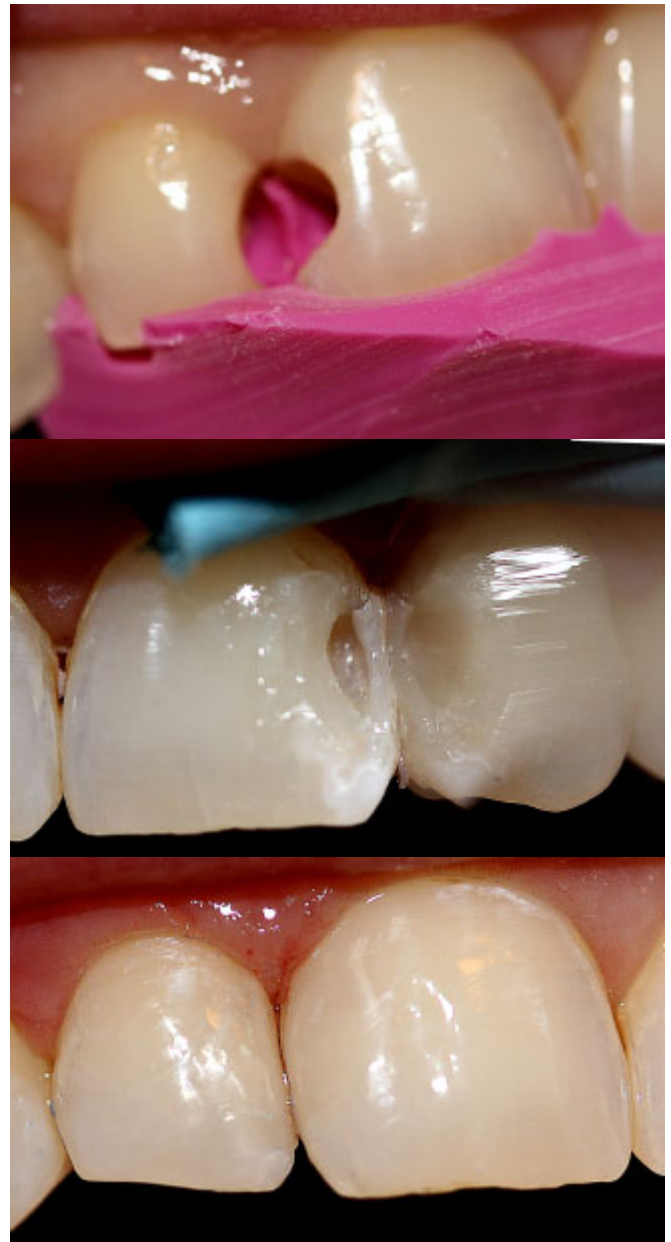
**Fig. 3.** Vanini Preparation of teeth 12, 11, 21, 22: a – vestibular view; b – palatal view.

Enamel Dlus Hri (Micerium-GDF GmbH, Rosbach, Germany) was selected for reconstruction of 21 and 22. This is a monohybrid composite designed to achieve highly esthetic results in direct adhesive restoration of anterior incisors. It features excellent opalescence, colour intensity – the opacity and fluorescence of dentine mass are similar to those of hard dental tissues, white intensity and high transparency of enamel masses. Colour characteristics and transparency were analyzed for each tooth and colour map was prepared. The following were used: enamel mass UE2, dentine mass UD2, UD3, UD4, as well as IWS (figure 4), applied as per the stratification technique (total etching, flushing, application of a thin adhesive layer and multilayer application of approximately 10-15 layers per tooth).



**Fig. 4.** Diagram of stratification.

All materials were heated in advance in an oven at 55°C (Ena Heat, Micrium S.p.A). Following the etching and bonding, the prepared imprint was set on the processed surfaces as a matrix (figure 5a). The initial application of enamel mass UE2 (2 layers) was over the palatal surface to correspond the natural palatal enamel structure. Then, enamel mass UE2 was applied proximally - 2 layers (figure 5b). The hollow formed is surrounded by the enamel masses applied on the palatal and proximal surfaces and dentine tissue at the tooth pulp side. At this stage, dentine masses are consecutively applied from darker to lighter colour UD4, UD3, UD2; approximately 6-8 layers. The surface layer was applied in enamel mass UE2 1-2 layers and IWS and was brushed up with adhesive moisturized fine brush. The final brushing and polishing was done as per the system suggested by L. Vanini [7, 8, 9] (figure 5c).



**Fig. 5.** Stages of layer application of composite fillings: a – application of the imprint matrix; b – palatal and approximal material application; c – finally polished fillings.

Clinical time spent on reconstruction of crowns of teeth 12, 11, 21 and 22 - approximately 4.5 – 5 hours during daytime, with no direct intensive sunlight and almost no reflector.

#### **Results and Discussion**

**Immediate results:** indistinguishable fillings of the preserved hard tooth tissues, considerably better appearance of the frontal dental section, positive psychological and emotional outcome, enhanced social activity of the patient (figure 6).



**Fig. 6.** View of the upper anterior teeth of patient: a – prior treatment; b – after treatment of teeth 11, 12, 21, 22 by stratification technique.

**Control check-up three years later:** obviously preserved results, natural smile, comfort and improved self-esteem of the patient.

Restoring a defect in an anterior tooth can be one of the most difficult cosmetic procedures to perform in dentistry. The ability to recreate tooth structure using composite materials to achieve the same structure outline, morphology and texture is very challenging. After treatment restorations require periodic maintenance to preserve results. Additionally, oral hygiene protocols should be emphasized.

The application of stratification technique aids the achievement of excellent esthetic results. It is proved, that the application of composite material in very thin layers under 0.5 mm successfully replicates opalescence, transparency and fluorescence of enamel and dentine [2, 5, 6]. Accordingly, to achieve composite application in thin layers it is important to heat the composite in an oven at 37° C or 55° C allowing the very thin layering [8, 9, 10].

### Conclusion

The excellent esthetic results were obtained not only because of the qualities of these modern composite materials of wide variety of dentine and enamel masses but also because of the used stratification technique of application.

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