

CURRENT TECHNIQUES FOR LAYERING OF COMPOSITE MATERIALS

MONA IONAȘ¹, CORNEL GHEORGHE BOITOR²

^{1,2}“Lucian Blaga” University of Sibiu

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Abstract: The restorations of composite materials are available to any dentist, but when it comes to aesthetics, the layering is important. There are many layering techniques with one, two or with multiple opacities. We will present two layering techniques with dentin and enamel composites. Both techniques have aesthetic results if the working technique is respected. The instruments that allow a controlled application of the thickness of the enamel layer help to achieve predictable results.

INTRODUCTION

Restorations of composite materials are within reach of any dentist, but when it comes to aesthetics the layering is very important. In the case of aesthetics, according to the type of composite class we choose, we know what we can obtain from the direct restoration. If we want a top composite, we will choose a nanocomposite that maintains the surface gloss, that has a high inorganic load and a high resistance level, but the purchase price therefore will be higher. If we want a mass composite at a lower price, then our option will be either a nano-hybrid or a micro-hybrid. Both are characterized by long lasting surface gloss, high inorganic load and a high resistance level.

When we want restorations for the front teeth, we can use composite materials with one, with two or with multiple opacities. On the material market we can see universal colours, such as body, with an intermediate saturation, but also more saturated colours such as the ones of dentine, or more translucent colours such as the ones of enamel, to which can be added special effects such as shades of orange or blue.(1)

A direct restoration must mimic the appearance of the dental tissues. The colour of dental tissues is given by the propagation of light through all the structures of the dental tissues: enamel, dentin and pulp tissue. The optical properties of dental tissues are given by the colour parameters as well as translucency, opalescence, and the surface texture of the dental tissues.(2,3) Within the colour parameters saturation is given by dentin, the enamel only highlights the aesthetics of the dental tissues. The layer of enamel material cannot change the colour of the tooth, it only gives the final translucency to the restoration. Basically, the dominant amount of composite material represents the dentin. The thickness of the composite enamel layer is of approx. 0.5 mm. In young patients there occurs an additional problem caused by the appearance of the incisal edge, which is characterized by translucency and opacity. To solve this, it is important that the incisal edge is reconstructed only with enamel composite.(4,5) The best enamel composite is the one that mimics the opalescence and translucency of natural enamel.(6)

PURPOSE

In our article we aim to present comparatively the classical restoration technique in which both dentine and enamel have the same colour and the Style Italiano technique in which the colour of dentin is different from that of enamel.

MATERIALS AND METHODS

The preparation of dental structures for stratification involves the removal of altered dental tissues. It is preferable to achieve a beveled edge of the preparation to improve the adhesion as well as the ultimate aesthetic effect.(7,8) In case of extended coronary destructions, the silicone key may be used to facilitate the layering of composite materials.(9) The classical layering technique involves the use of the same colour in the dentin, body and enamel opacities. The classical recommendation when it comes to obtaining an A2 colour (VITA key) is to use A2 dentine and A2 enamel, possibly A2 body shades, translucent, pigments. The thickness of the material layers depends on the characteristics of the reconstructed tooth and on the user's experience. The Style Italiano technique involves the use of a layering recipe in which the layer of enamel composite has a strictly controlled thickness of 0.5 mm. The deep layer consists of a dentin-like material that gives the final shade of reconstruction based on the VITA key. The A3E-colored enamel composite is used almost exclusively for the surface.(10,11) Table no. 1 presents the techniques step-by-step based on an acrylic model, on which the tooth 21 was cut and reconstructed according to the classical technique, respectively according to the Style Italiano technique. Most work steps are similar. We have insisted on the variation brought by the Style Italiano technique.

RESULTS AND DISCUSSIONS











The initiators of this technique have devised hand tools that make it easy to carry out the application steps of the composite material. LM-Arte Misura is a special cylindroconical shape tool used in the technique of layering composites with two opacities. After the layering process of the dentine in the corresponding thickness is achieved, the space for the final enamel layer is measured by means of LM-Arte Misura. The cylindroconical section rests on the enamel of the natural tooth. After applying the dentin composite a section of 0.5 mm thickness remains for the enamel composite to be applied. The thickness of the enamel composite material must be half or less than the thickness of the dental enamel.(6)

After the stage of layering comes the realization of the apparent surface, followed by the creation of the secondary anatomy, the creation of the tertiary anatomy, the finishing and polishing.(12)

¹Corresponding author: Mona Ionaș, Str. Lucian Blaga, Nr. 2A, Sibiu, Romania, E-mail: stomatologmonaionas@yahoo.com, Phone: +40269 436777
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CLINICAL ASPECTS

Table no. 1. Illustration of the layering technique with composite materials in the classical versus the Style Italiano variant

Item no.	Explanations regarding the work stage	Specificity of the stage	Images
1	Realization of the silicone key according to the desired shape of the tooth in the treatment. The shape of the tooth is restored via mock-up or wax-up.	Common stage	
2	Testing the silicone key on the prepared tooth	Common stage	
3	Drawing the boundary of the palatal wall on the silicone key with a sharp tool	Common stage	
4	Apply the enamel-type composite material on the silicone key and then apply the silicone key to the teeth	Common stage	
5	Press the silicone key towards the tooth and complete with enamel-type material to ensure a good adherence of the material to the tooth. It can also be applied to the side walls. Check that the incisal edge is correctly restored.	Common stage	
6	Remove the silicone key and apply the materials for the interior of the reconstitution. In the classical technique shades of dentin and enamel, such as A2 Dentin and A2 Enamel, are used in various thickness. For outstanding effects shades of body, translucent etc. can be added.	Specific working classical technique	
7	This is a specific working stage of the Style Italiano technique in which the excess of dentine material is removed with the Misura instrument (LM Arte). The combination of different colors is allowed here, for example dental A2 with enamel A3.	Style Italiano technique	
8	The final enamel layer is not applied.	Style Italiano technique	
9	Final aspect of the reconstruction, classical technique	Classical technique	
10	The final aspect of the reconstitution after finishing	Style Italiano technique	

The classical technology is based primarily on simplification without having a scientific basis. The enamel composite modifies the base colour of the dentin composite and is directly related to the thickness of the enamel dental layer. The layer of the enamel composite has a lower saturation than the dentin composite and thus it looks more translucent.(1,13)

The variation in the amount of enamel and dentin material will trigger changes in the colour, opacity and translucency of the final restoration. The restoration will receive grey shades when it has a lower amount of dentin and increased enamel amount and will turn opaque when it has an increased amount of dentin but a lower amount of enamel.(11)

CONCLUSIONS

Clinicians can perform aesthetic restorations through rapid stratification techniques. In both techniques described above the layer of enamel composite must be applied with a thickness less than that of the dental enamel tissue. The tools suggested by the Style Italiano technique make it easier to estimate the amount of enamel composite to be applied.

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