

Technological aspects regarding the process of obtaining of ceramic veneers – Part I

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ABSTRACT

Dental veneers made of ceramic masses are considered on conservative solution for patients that require an enhancement of shape, shade, dimension and/or position of anterior teeth. Ceramic veneers are successfully used on large scale to hide tooth discoloration, to correct the position and minor defects of teeth, without removing significant quantities of hard tissues.

Keywords: veneers, ceramic masses, pressed ceramic, CAD/CAM

INTRODUCTION

In the last two decades, patients from Romania, at the suggestion of dentists, began to choose dental treatment of higher quality, less invasive, even if they came with higher costs than classic treatment option [1-4].

Thus, based on the fast evolution of technology and materials used in dental field, dental office and dental laboratory, teams made of dentist and dental technician have made a huge investment in their professional training, being able at this moment to offer Romanian patients state-of-the-art prosthetic treatments, minimally invasive, which, if described in an easy-to-understand way, become very attractive in a country in which the trust in medical system is still very low [1-4].

MATERIAL AND METHOD

A state-of-the-art dental treatment is also represented by obtaining and applying of ceramic veneers.

Regarding dental veneers made of ceramic masses, these are considered to be a conservative solution for patients that require an enhancement of shape, shade, dimension and/or position of anterior teeth. Ceramic veneers are successfully used on a large scale to hide tooth discoloration, to correct the position and minor defects of teeth, without removing significant quantities of hard tissues.

Thus, this material presents several technological aspects regarding obtaining of veneers from ceramic masses, using CAD/CAM technology for obtaining the wax patterns of final ceramic veneers. Scanning of working model was made in dental laboratory with the help of a professional scanning machine, specially designed for dental technology.

RESULTS/ CASE PRESENTATION

A 29 years old patient, presented at dental office for esthetic rehabilitation of maxillary anterior teeth af-

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ected due to a severe color anomaly. After a rigorous clinical examination followed by a radiologic examination, the dentist together with the patient established that the restoration of maxillary frontal teeth should be performed using indirect veneer technique. Specifically, the treatment method involves obtaining of ceramic veneers in dental laboratory. The technological work-flow, specific for dental laboratory, for obtaining ceramic veneers is [1-4]:

- Cleaning and decontamination of the impression;
- Creating the sectional working model;
- Scanning of working model with a specialized dental scanner in order to obtain a virtual model;
- Creating the virtual design of the veneers on the computer using a DOWS like digital software;
- Milling of wax pattern for the veneers using the CAD/CAM technology;
- Investing the wax pattern;
- Obtaining of the veneers through press technique of the ceramic;
- De-vesting, fitting and processing of the veneers;
- Applying of ceramic masses layer by layer and thermal processing;

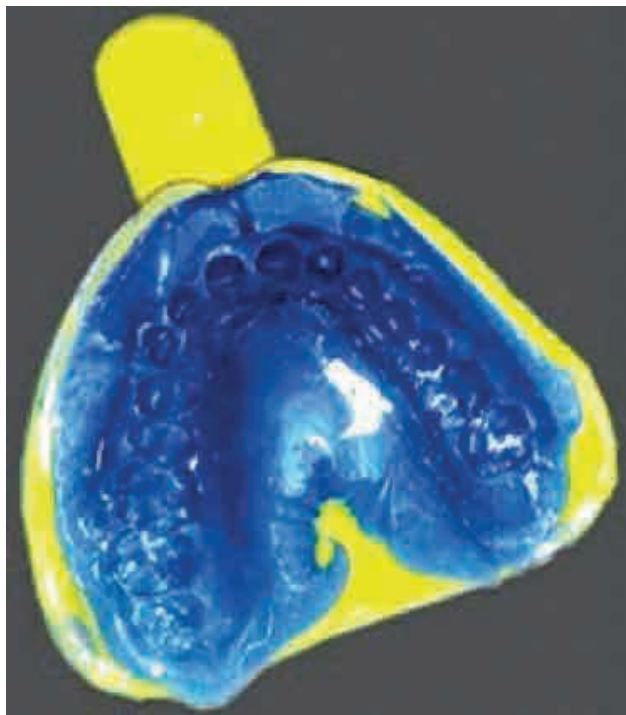


FIGURE 1. The functional impression of maxillary arch in standard impression tray using an addition silicon material of two consistency: putty and light body



FIGURE 2. The sectional working model made of type 4 die stone



FIGURE 3. The virtual maxillary working model, obtained by scanning the physical model with a dental laboratory scanner. The design of dental veneers was made using DWOS digital software

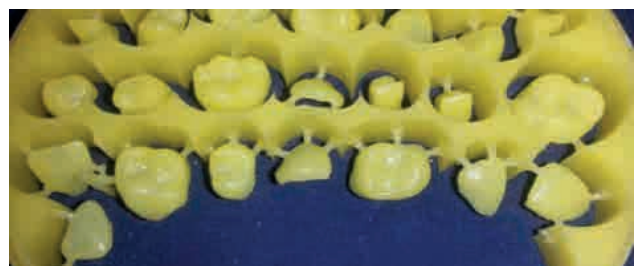


FIGURE 3. The wax pattern after milling



FIGURE 4. Investing of veneer wax patterns



FIGURE 7. De-vesting of the veneers using the sand blaster



FIGURE 5. Heating of the mould



FIGURE 8. Veneers after de-vesting

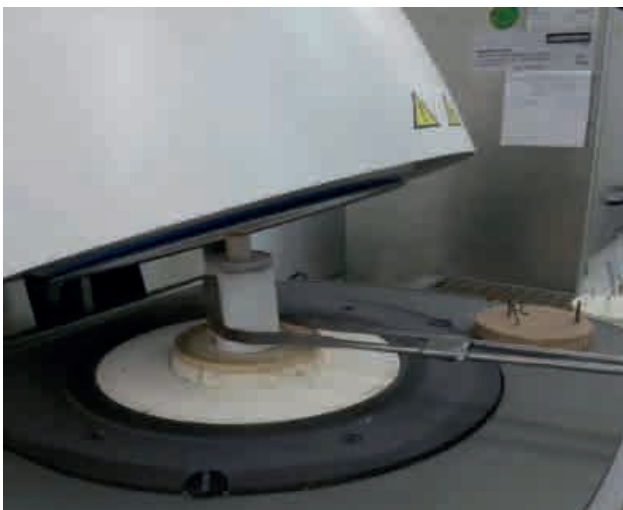


FIGURE 6. Pressing of ceramic masses in the mould



FIGURE 9. Processing and fitting of the veneers on the working model



FIGURE 10. Applying of dental ceramic layer by layer



FIGURE 11. Ceramic veneer before firing in the ceramic furnace

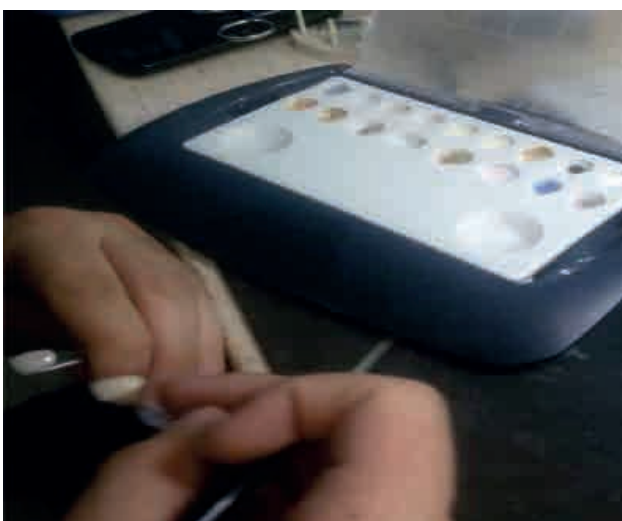


FIGURE 12. The final touch, the ceramic veneers are stained and glazed as required



FIGURE 13. Ceramic veneers applied on the functional model, ready to be send in the dental office for adhesive luting on teeth

DISCUSSIONS

Dental veneers have appeared as a structural change of partial crowns. If initially partial crowns maintain the esthetic by conserving the labial face of teeth [5-7], once dental materials evolved, the labial face of teeth was reconstructed from esthetic reasons. Initially, the reconstruction was made with polymeric materials, in dental office or in dental laboratory, and subsequently the material of choice was dental ceramic [8]. Ceramic veneers have an increased structural and coloristic resistance over time, as proven by many in vivo and in vitro studies [9,10].

Regarding hard dental tissues that are affected while teeth preparation, the prosthetic treatment with ceramic veneers is the less invasive one. A selective preparation of the tooth is used, and even a non-prep technique is suitable in certain cases, when is required only a chemical treatment of tooth surface to ensure an adhesive luting between veneer and dental hard tissues [11-14]. When using full crowns, metal-ceramic or all-ceramic, the removal of hard dental tissues is a significant one, fact that requires the removal of tooth pulp and root treatment for teeth covered.

Technological evolutions are not easy to obtain and comes with a certain cost. Both dentist and dental technician have to invest in devices and professional training in order to be able to obtain such of prosthetic restorations, and all investments will be found in the final price paid by the patient. A well-argued exposure of facts between a prosthetic restoration more accessible, with a high dental sacrifice and negative effects on long term, and a more expensive restoration with esthetic and hard tissue benefits on medium and long term, could turn the balance and convince the patient to choose ceramic veneers.

The development of CAD/CAM technology, used for obtaining ceramic veneers or wax pattern for press technology, have made the work of dental technician easier and facilitate the process of obtaining ceramic veneers. Despite initial costs related to the equipment

and professional training, the effect on medium and long term had led to decrease of price for the final product without quality loss [15-17].

All the afore arguments have changed the treatment option among patients when speaking about restoring the esthetic in frontal area, maxillary or mandibular, transition being made from full crowns to ceramic veneers.

CONCLUSIONS

Ceramic veneers are currently one of the most requested prosthetic treatments in dental offices. Even if initially ceramic veneers had limited indications, in recent years their increasingly widespread use has been noted.

Ceramic veneers reconstruct the esthetic affected in a layer with a minimal thickness of ceramic mass, with a success rate over 90% over a 10-year time span.

Ceramic veneers have become popular so quickly, because they fulfill several important objectives simul-

taneously: biological, functional, aesthetic, stability of results over time, economically.

At this moment, there are several methods to obtain ceramic veneers, from the most laborious – feldspathic veneers on refractory base, to systems that are easier to handle – press ceramic, to the systems with a very easy handling and a good reproducibility – CAD/CAM systems.

Veneers made of ceramic masses are very durable. Even if they are very thin (0.5-0.7mm) and fragile, once luted on the teeth veneers become stronger. They are durable over time, if a good oral hygiene is maintained.

The color of veneers given by the porcelain material is more stable in time comparative to other materials, the ceramic is glossy, it doesn't stain in contact with tabaco, spices and other food pigments.

The use of ceramic veneers wouldn't be possible without the discover of adhesion on dental hard tissues using the enamel acid etching technique, the appearance of resin-based luting cements, and pretreatment of the inner surface of veneers technique.

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