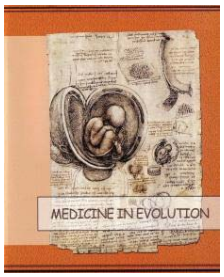
Perception and illusion in dental aesthetics



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Abstract

Aim and objectives: The objectives in performing fixed prosthetic restorations were the following: Replacing lost tissues, restoring the functions of the stomatognathic system: aesthetics, phonetics, functionality, mastication and creating illusion, using different techniques to make the tooth look younger, older or wider.

Material and methods: This part presents the materials and the different methods in the technological operations for the realization of three fixed metal-ceramic partial prostheses, with rejuvenated appearance, with aged appearance and the third with the illusion that the tooth looks wider, the differences that will be listed below.

Results: The metal-ceramic works are accepted relatively easily, offering special satisfactions to the patients, but also to the doctors, they transform the dentition into an aesthetic and functional, comfortable one, restoring the morphology and the masticatory functions.

Conclusions: Ceramics have a very wide range of colors, having the great advantage of the possibility of combining them. Thus, some parts of the tooth can be made in certain shades, others in other shades, giving the artificial tooth a very close apperance to the natural one.

Keywords: Illusion, perception, ceramics, frontal teeth, aesthetics.

INTRODUCTION

Dentistry involves a synergistic combination of biofunctional-mechanical-aesthetic principles and a permanent evolution in a direction influenced, more recently, by the wishes of patients. Thus, in the last decades, a younger, now mature specialty of Dentistry called Dental Aesthetics appeared. (1)

Dental aesthetics is a branch of modern dentistry that studies the laws and principles that underlie the appreciation and creation of beauty in dental medical practice.

The main purpose of this branch is the analysis, design and realization of the "perfect smile". Like any other science, or art, aesthetics has well-structured rules, based on scientific principles. In designing and implementing a treatment plan, compliance with these aesthetic criteria has an important role in obtaining the best and long-lasting result. (2)

The Hollywood smile is becoming more and more important, with a rigorous dental alignment, healthy white teeth, well-contoured lips and an increasingly sophisticated facial make-up. All this is due to the constant need of people to look better and to be more pleasing to their peers. (3)

Now by controlling the illusion the teeth can be cosmetized so that they look the way we want: narrower or wider; smaller or larger; short or long; old or young; male or female. The ultimate goal is to achieve aesthetic restorations with natural appearance.

In recent decades, R.E. Goldstein, S. Hobo, G. Chiche, S. Perelmuter, M. Magne, and many other clinicians have established aesthetic rules in fixed prosthesis, thus advancing both the theory and practice of aesthetic restorations.

Perception is "the image resulting from the full reflection of objects and phenomena that act directly on the sense organs" (DEX).

In a broad sense, aesthetics is a product of the intellect; when the term aesthetic or unsightly is used it produces an emotion with pleasant or unpleasant connotations.

In the case of dentistry we refer especially to visual perception. Aesthetic perception is a complex process that will allow the dental technician, who has sufficient knowledge in the field, to see certain things that an ordinary person does not notice.

The perception process is achieved through a sensory arousal, which intellectually develops a response in accordance with previous experiences, or which generates an unconscious interpretation. (4)

In visual perception, the physiological function of visual cells brings stimulus to the centers of vision where it causes a psychological response conditioned by a number of factors: personality, cultural, physical, physiological, sociological influences and the degree of cultivation of each individual's aesthetic sense. Therefore, the aesthetic appreciation is not purely objective, but is influenced by the inner feelings of each individual. In addition, the evaluation of aesthetics requires training to improve the perception from an artistic perspective and to allow the elaboration of judgments in accordance with objective criteria. (5)

The illusion “represents a false perception of an object present before the eyes, determined by the laws of formation of perceptions or by certain mental or nervous states” (DEX). From an artistic point of view, illusion is the art of changing perception it looks different from its actual appearance. "Our gaze is often deceived by the effects of optical illusion" (Goldstein).

Understanding the basic principles of perception must precede their use to control illusion. Many of the basic principles of illusion, such as shape, light, line, can be applied in dentistry. In the presence of excessive light or in the absence of light, the shapes cannot be distinguished because shadows are needed to emphasize the contour or curvature of the surface and depth.

Using the principles of perception in the control of illusion

A) The principle of enlightenment

The basic artistic influence presented in the principle of lighting can be manipulated to change the size and shape of the tooth by illusion. This influence is the key to the Girl's Law.

Face law is the most important concept used in conforming prosthetic restorations. His understanding and interaction with the concept of light and darkness will allow the dentist to properly conform to all aesthetic restorations.

The apparent face is that portion of a surface that is visible at a glance. The perimeter of the apparent face is dictated by the position of the observer in relation to the tooth.

In ceramic prosthetic restorations with the help of pigments, many illusions can be created based on the aesthetic principle of lighting. Each time only the "apparent face" will be manipulated and not the real face

B) The principle of the line

The relationships between the lines play an important role in creating illusions.

Horizontal lines in the form of cervical pigmentation, texturing, hypoplastic white lines or long, straight incisal edges create illusions of width. The widening of the face has the same effect. The vertical lines in the form of accentuated growth grooves, hypoplastic lines and vertical texture accentuate the height. The same illusion can be obtained by modifying the incisal edges and embrasures.

C) Conforming and contouring

The most common illusion is the creation of different contours. The eye is sensitive to the contours of the shape that projects against the background of the dark space of the oral cavity. It's easy, the modification of an incisal edge can create desired illusions

The objectives pursued in carrying out fixed prosthetic restorations were the following:

-Replacement of lost tissues

-Restoring the functions of the stomatognathic system: aesthetics, phonetics, functionality, mastication

-Creating the illusion, using different techniques to make the tooth look younger, older or wider. (6)

MATERIAL AND METHODS

This part presents the materials and the different methods in technological operations

for the realization of three fixed metal-ceramic partial prostheses with a rejuvenated appearance, with an aged appearance and the third with the illusion that the tooth looks wider, each prosthetic work having the characteristics and differences that will be listed below.

After establishing the prosthetic plan, the doctor prepared by grinding tooth 1.1 in order to perform the fixed metal - ceramic prosthetic restoration.

In the following are presented the technological stages and the materials used that led to the realization of the finished prosthetic parts.

The first step performed, which is the beginning in making a prosthesis is the impression of the maxillary prosthetic field by the dentist.

The working model used has a detachable abutment, with dowel pin offering a number of advantages. Due to the possibility of disengaging the abutment from the whole model, it was possible to model the proximal faces with optimal visibility.

The casting of the actual working model was made of class IV plaster reinforced with Pico Rock resin.

The model was made in order to obtain the exact shape and size of the final work. The actual packaging of the model of the future fixed partial denture. For the next step, the one-time packaging method was chosen. With the help of the Bego vibro-vacuum mixer, the Bellavest SH packaging table (Bego, Bremen, Germany) was prepared.

After packing, about an hour later, the mold was preheated in the preheating oven, where the temperature rise in 60 minutes to 400 °, in order to melt the model wax, evaporate the water from the packing table and to start the thermal expansion.

The second stage was the heating of the mold, through which the mold temperature was raised to 950 ° within 30 minutes, where the total drying of the mold, the complete burning of the impression material and bringing the mold temperature as close as possible to the thermal values of the alloy melted.

After pouring and slowly cooling the alloy, the casting was unpacked by mechanical means and sandblasted to remove the remnants of the packing mass and the oxide layer from the surface. The blasting was performed in a sandblaster, with Al2O3 granules with a diameter of 250 μm.

After preparing the metal component, we move on to the next stage, namely the burning of the ceramic. Before depositing the ceramic mass, the model was cleaned, after which it was insulated with a soapy solution to avoid the buffer effect of the plaster on the humidity of the ceramic mass.

When the ceramic layers were deposited between the metal component and the technician's fingers, filter paper was interposed, which has the role of absorbing the excess of diluent liquid.

The opaque was applied in 2 coats. Dentine was deposited over the opaque layer with the help of a brush, in large quantities, under vibration. The excess liquid was removed with the help of filter paper.

After applying the dentin and modeling according to the oversized dental morphology, the enamel was applied to obtain incisal transparency.

The dentine, at the incisal edge, was cut in the bevel tehnique with the help of a sharp tool. Then, the enamel was applied on the buccal, and on the palatal the transparent was applied.

After removing the work from the model, the dentin (na3B) was added on the mesial and distal faces of the tooth, obtaining an excess of 0.5-1 mm necessary for the contact points.

With a clean and damp brush, the inside of the crowns was brushed, removing any ceramic mass granules. The edges were also corrected by adding ceramic tableware. Thus, the prepared piece was placed on the refractory support and placed in front of the oven for 10 minutes for drying.

After this time, the piece together with the refractory support were introduced in the oven. The sintering was done in the temperature range 980 ° C, with vacuum, for 6-7 minutes.

Finally, the glaze (Vita 725) was applied to the entire porcelain surface, dissolved in a special liquid.

The package of teeth was individualized with one of the brown masses 713-717, and the incisal edge was brushed with a gray color.

After sintering in the presence of oxygen, at 930 °, for 2-3 min, the finished part resulted.

Aged-looking ceramic-metal crown

The cultural influence of age is a sensitive issue for patients who want cosmetic treatment and a number of features must be considered.

In order to make a fixed partial denture with an aged appearance, the following aspects were taken into account: the older teeth are smoother, darker in color, with a higher degree of saturation, with a lower incisal edge, longer towards the gingival, incisal edges are more worn and uniform, small incisal abrasions, more characterized, show cracks, show moroni spots. (Fig. 1)

Figure 1. Reproduction of the crown of the mature tooth

Rejuvenated metal-ceramic crown

Natural, beautiful teeth or artificial substitutes must be in harmony with the personality, age and sex of the patient.

In order to make the metal-ceramic crown with a rejuvenated appearance, the following characteristics were taken into account: young teeth are more textured, brighter, and we can notice the presence of translucency at the incisal edge, they have a lower degree of saturation, and the incisal edges present, which makes the sides shorter than the incisors and canines, they also have significant incisal abrasions, small gingival abrasions, few characterizations, often with white hypoplasia lines or spots. (Fig. 2)

Figure 2. Reproduction of young tooth appearance crown

Metal-ceramic crown with the illusion that the tooth looks wider

The upper central incisor reflects anterior, superior, inferior, and lateral light.

Using the modeling to better reflect the light in the gingival third and below the incisal curvature so appeared the effect of shortening and widening the tooth.

Horizontal lines in the form of cervical pigmentation, texturing, hypoplastic white lines or long, straight incisal edges create illusions of width.

In the case of misaligned teeth, it may be necessary to create the illusion of a wider tooth in a smaller space.

This can be done by bringing the contact points labially as far as possible and flattening the surfaces to reflect all the light.

RESULTS

Metal-ceramic crowns almost perfectly reconstitute the color and constitution of the enamel of neighboring teeth, compared to metal-acrylic works, in which the acrylate veneers blunt over time due to masticatory forces, turn yellow, deteriorating shortly after the prosthetic work.

The ceramic completely covers the metal support of the prosthetic work, so the natural and intact aspect of the dental arch will be restored.

The metal-ceramic works are accepted relatively easily, offering pleasant results to the patients, but also to the doctors, they transform the dentition into an aesthetic and functional, comfortable one, restoring the morphology and the masticatory functions.

The volume of mixed metal-ceramic works is less than or equal to that of natural teeth and is fixed to the abutment teeth (natural or implanted) by cementing, gluing or screwing.

DISCUSSIONS

Now by controlling the illusion the teeth can be cosmetized so that they look the way we want them: narrower or wider; smaller or larger; short or long; old or young; male or female. The final goal is to achieve aesthetic restorations with a natural look (Fig. 3)

Figure 3. Making three metal-ceramic crowns: young tooth, mature tooth, wide tooth

In recent decades, R.E. Goldstein, S. Hobo, G. Chiche, S. Perelmuter, M. Magne, and many other clinicians have established aesthetic rules in fixed prosthesis, thus advancing both the theory and practice of aesthetic restorations.

Underline new, important aspects of the study. Do not repeat in detail data which have been presented in previous sections. Include implications of revealed aspects and their limitations, including implications for future studies. Connect your observations to other relevant studies. Relate the results to the aim proposed for the study. [Book Antiqua, 11 point, normal, justified alignment].

CONCLUSIONS

Ceramics have a very wide range of colors, having the great advantage of the possibility of combining them. Thus, some parts of the tooth can be made in certain shades, others in other shades, giving the artificial tooth a very close apperance to the natural one.

Ceramics can restore various stains on the initial teeth, various defects in shape and color.

The front teeth, where no mastication is performed, can be covered by ceramic crowns without metal support, thus managing to restore the translucency of the initial teeth.

Ceramics imitate the natural in the highest form, it can be sanitized, and it is the best tolerated material in the oral cavity, but it is also the most expensive one.

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