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METAL CERAMIC, NAMELY METAL COMPOSITE PROSTHESIS, VIABLE ESTHETIC ALTERNATIVES TO CONTEMPORARY DENTISTRY?

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Aim This study aims at an analysis of the clinical and technological aspects that decisively influence the clinical esthetic finality, as reflected in a representative number of clinical cases diagnosed with partially reduced edentation, the therapeutic choices being represented by metal ceramic, namely metal composite restorations. Material and Method:

The factual material was represented by a number of 25 clinical cases diagnosed with partially reduced edentation, the therapeutic solutions being represented by metal ceramic, namely metal composite bridges, the analysis of the multiple factors that influence the technological algorithm of certain representative practical cases leading to pertinent conclusions regarding the individualization of the clinical technological algorithm. Results and Discussions :Out of the extremely large and diverse range of esthetic restorative materials, ceramic remains the "uncrowned queen of restorative materials", ensuring that sense of naturalness so much sought after by its translucent similarity to dental enamel. Conclusions:The particular conditions of the prosthetic field influence the clinical technological details of the treatment algorithm, its clinical finality being that of masking deficits or excesses, in full agreement with the corrective pro-prosthetic interventions.

Keywords:edentulous, esthetics, metalo-ceramic crown, metalo-composite crown;

Introduction

Biomaterials and high-performance technology contribute decisively to the choice and elaboration of conjoint prostheses, metal ceramic and metal composite prostheses, being still used in the dental medical practice of our time[1,2].

Aim

This study aims at an analysis of the clinical and technological aspects that decisively influence the clinical esthetic finality, as reflected in a representative number of clinical cases diagnosed with partially reduced edentation, the therapeutic choices being represented by metal ceramic, namely metal composite restorations.

Material and Method

The factual material was represented by a number of 25 clinical cases diagnosed with partially reduced edentation, the therapeutic solutions being represented by metal ceramic, namely metal composite bridges, the analysis of the multiple factors that influence the technological algorithm of certain representative practical cases leading to pertinent conclusions regarding the individualization of the clinical technological algorithm, in correlation with the specific aspects of each particular clinical case.

Results and Discussions

Out of the extremely large and diverse range of esthetic restorative materials, ceramic remains the “uncrowned queen of restorative materials”, ensuring that sense of naturalness so much sought after by its translucent similarity to dental enamel. In esthetic restorations it is mandatory to apply an opaque layer to prevent the transparency of subjacent materials, such as metal, in metal ceramic constructions.

An important role in the final aspect of restoration is played by the specific aspects of the technological algorithm that applies to each type of restoration.

For the metal ceramic crowns the metallic framework needs to be conditioned through thermal oxidation for the optimization of the metal ceramic bond; the metallic component is introduced in the oven, in air atmosphere, at temperatures ranging according to the alloy (960º-980º C for noble alloys and 1035º C for non noble alloys) and it is maintained for 8-10 minutes, in case of noble alloys, and for 30 seconds for non noble alloys(Fig.1).

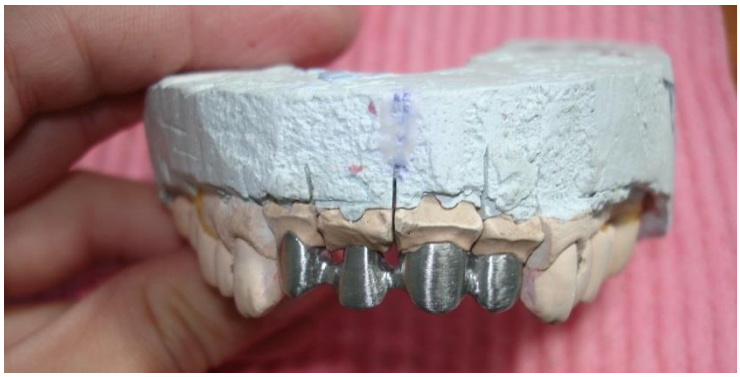

Fig. 1Aspect of framework for metallo-ceramic fixed prosthesis

The deposition, modeling and burning of the ceramic mass layers, the thickness of physiognomic components being of 1.8 – 2 mm at the end.

The types of powders, selected by means of a color key, are mixed with the liquid in porcelain pots or on glass plates until a creamy paste is obtained(Fig. 2).

Fig. 2 The types of ceramic powders

The application of the ceramic mass on the metallic framework conditioned by means of thermal oxidation is made by the deposition, modeling and successive burning of the following layers: opaquer (primer); dentine layer + enamel layer (basic layers); superficial transparent mass layer (for glazing);

The crown mass is applied followed by the dentine paste and then the enamel one. Preheating is made "by the oven" for at least 5 minutes(Fig. 3). There follows burning in vacuum conditions for 6-7 minutes at 980º C, followed by progressive cooling.

At this stage corrections can be made regarding a corrective burn.

Fig. 3 Aspects of dentine paste

In order to obtain the chromatic effect desired, it is required to cover approximately one third of the tooth with enamel paste. It is prepared by grating the required space for the enamel application(Fig.4).

Fig. 4 Aspects of technological stage

After the corrective burn the necessary finishing is carried out in view of obtaining correct occlusal relationship with the opponent teeth.

Fig. 5 Final aspect of glazing

Glazing is obtained by applying and burning a final superficial layer of transparent mass, the operation lasting for 3 minutes at 930º C under normal atmospheric conditions(Fig.5).

Prior to glazing or even during glazing a series of chromatic artifices can be made, with special effects[3,4].

One should avoid the tendency to "over-glaze", which frequently creates the impression of a "fake tooth"

After glazing, the interior of the crown can be sanded, once the ceramic finish was waxed. The metallic edges are finally finished.

By means of opaque and mineral pigments changes, the three attributes of color will be adjusted: tonality, by adding pigments of intense paste, - saturation, by increasing the quantity of color or by adding grey, - luminosity: to make the color darker it is easy to use neutralizing pigmentations of the complementary color (for instance, to decrease yellow, violet will be used, while for orange, blue). To make the color lighter, we will add white, but the denaturant effect should be taken into account and, if the case may be, by adding coloring pigments[5,6,7].

The first lab stage using Ceramage, composite material, which leads to high end results in the field of esthetic reconstructions is the construction of the work models out of hard/extra-hard gypsums with removable bolts; Mounting the working models in the simulator, based on the date recorded with the facial arch for this purpose, in view of checking the relationships of the gnathoprosthetic apparatus with the model of the opponent arch, in static occlusion and mandible dynamics;

The model of the metallic component of the metal composite prosthesis is created in wax;

For the mechanic retention of the physiognomic component various macro-retentions are used: pearls, buttons, retentive cavities. The modern techniques have the advantage of pre-processed pearls[8,9,10]. Among the companies that produce pearled retentions we can mention: IVOCLAR, BREDENT, ASTAR .The sizes in which they are delivered are: 0,2; 0,4; 0,6 and 0,8 mm. The application method consists in brushing an adhesive on the surface of the wax model. The pearls are applied by means of a sharp pointed instrument[11]. The adhesive maintains its sticking properties until the moment of irradiation (for 5 seconds) with a lamp that produces a luminous flux in the visible spectrum.

The transformation of the model in metallic skeleton: the preparation for packaging, the packing per se, melting and casting the dental alloy in the mould, demounting and mechanical processing;

Plating the metallic framework – the Glass Composite Dentine (Major) technique:the surface of the metallic skeleton which is to be plated, equipped with pearled retentions (Fig. 6), is sandblasted with aluminum dioxide, finished and polished with vapors jet.

Fig. 6. Aspect of framework for composite material

It is very important the technological stage regarding the opaquer layer is applied(Fig.6).

Fig. 6 Adhesive Opaquer GCD Opaquer Colour is applied

For final clinical success it is very important to due the difference in fluidity of the masses we can make a unique polymerization,the dentine individualization is carried out then, by means of the make up colors and the application of a layer of Transparent T-O.

The part, submerged in glycerin, is polymerized once in the polymerization device, for 16 minutes, at a pressure of 6 bars, at 100º C (Fig. 7).

Fig. 7 Final aspects of the fixed prosthetic construction.

CONCLUSIONS

- Biomaterials and high performance technology bring a decisive contribution to the selection and elaboration of conjunct dentures, a constitutive part of composite therapy.
- The particular conditions of the prosthetic field influence the clinical technological details of the treatment algorithm, its clinical finality being that of masking deficits or excesses, in full agreement with the corrective pro-prosthetic interventions.

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