TECHNOLOGICAL ASPECTS FOR A CLINICAL CASE WITH DECREASED V.O.D. IN ORAL REHABILITATION

Anca Mihaela Viţalariu*, Diana Antonela Diaconu, Monica Silvia Tatarciuc
Department of Implantology, Removable Prosthodontics, and Dental Technology
Faculty of Dentistry, "Gr. T. Popa" University of Medicine and Pharmacy - Iaşi, Romania

***Corresponding author:** *Anca Mihaela Viţalariu, DMD, PhD*
Department of Implantology, Removable Prosthodontics, and Dental Technology
Faculty of Dental Medicine
"Gr. T. Popa" University of Medicine and Pharmacy
16 Universităţii Street, 700115, Iasi, Romania
E-mail: ancavitalariu@yahoo.com

ABSTRACT
This paper presents the case of a 43 years old female patient who needed a complex oral rehabilitation. The patient presented large areas of occlusal abrasion caused by night bruxism and a reduced vertical occlusal dimension. The treatment option was represented by metal-ceramic prosthetic appliances. The maintenance of the results was possible upon demand by warring night guards.

Keywords: oral rehabilitation, metal-ceramic technology

INTRODUCTION
Prosthetic treatment is an ongoing dilemma regarding biological principle following and the biomechanical principle applications of and means to create conditions for prosthetic parts insertion, their resistance and retention of organic substructures.

Complex fixed prosthetic treatment is considered more physiological than all other therapeutic solutions due to pure dental support, low volume and permanent fixity, conjunct prosthesis solve almost without deficit all functional disorders and is very popular in patient's goals.

In the fixed restorations domain, metal-ceramic technology owned supremacy, on the one hand, due to resistance conferred by metal framework, and on the other hand, through optimum aesthetic effect of esthetical component.

CLINICAL CASE
Patient M.V. aged at 43 years went to the dentist for solving functional disorders, especially masticator and aesthetic ones, caused by multiple coronary dental caries and general abrasion, caused by nocturnal bruxism. This is a vicious habit which involves rubbing or clenching of teeth as a very common phenomenon (50 - 96% of adults, 15% of children). Considering abrasion causes, the only viable treatment option was to achieve a complex oral rehabilitation by covering maxillary teeth with individualised metal-ceramic crowns and with metal-ceramic bridges at mandible, for restoring the individual size of vertical occlusion dimension [1]. Holistic and multidisciplinary approach is the optimal treatment planning to correct this situation, and duration of treatment is usually prolonged [2].

Extraoral clinical examination revealed

symptomatology presence at TMJ as noises and pain during mouth opening, painful facial muscles and vertical height of occlusion reduced by tooth abrasion. The oral clinical examination revealed the presence of multiples dental decay, and coronal restorations unfit both aesthetically and functionally (Fig. 1).

An important and very useful treatment step is the diagnostic wax-up, an extremely valuable tool that allows visualizing the future look prosthesis, that influence the patient to accept or reject proposed medical treatment solution, by comparing present appearance of teeth and with these at forecast time (Fig. 2). By using diagnostic wax-up it is allowed the determination of ideal size and optimal position of each tooth, through conformator made for provisional prosthesis and a silicone keys-guide for teeth preparation [3].

After the dental and endodontic treatments were achieved, organic substructures were prepared and global impression was recorded upon double mix technique (Fig. 3).

In order to obtain optimum mechanical strength model **Picodent Z260 V** gypsum at grade IV (*natural* colour) was used. To ensure an optimal prosthetic dental joint is mandatory to make models with removable dies. For this purpose we used **Bredent pins** (pin + Teflon sheath) and **Pindex process** (characterized by pins that are inserted into the model after gypsum setting) (Fig. 4).

To highlighting better the dental prosthetic joint and cervical limit of the preparation, which were performed with juxtagingival threshold, removable dies were prepared, by cutter removal on model of a portion of the marginal gingiva, around the tooth (Fig. 5).

Provisional prostheses emerged as compulsory staging for therapeutic algorithm, due to clinical case complexity and treatment duration. This stage ensure: protection of dental substructures preparations, provide healing guidance of marginal periodontal tissue affected by teeth polishing (through a better adaptation to cervical limits and an optimal emergence profile), prevent dental migrations and allows restoring all functions of the stomatognat system.

Temporary bridges application render as an interactive complex oral rehabilitation, offering to patients the opportunity to see "the preview" of prosthesis image, and to express any wishes about the shape and colour of teeth, preventing social disability until treatment completion (Fig. 6).

During the wax – up stage, sharp angles and retentive thresholds were avoided taking into account the stress forces that could appear at those levels, during sintering ceramic mass. Also a special attention was focused to individualize each prosthesis item to ensure an incizal / occlusal optimal space on esthetical component. At mandible level where single crowns prostheses were unified as blind bridges with small amplitude, areas of contact between the capes were made with wax with memory from sticking. In edentulous space due to absence of tooth 36 it was used preformed body wax, specifically designed for metal-ceramic technology (Fig. 7).


Fig. 1. Clinical case at baseline

Fig. 2. Diagnostic wax-up

Fig. 3. Global impressions

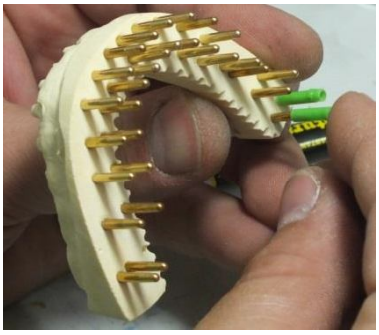

Fig. 4. Securing pins with double sheath

Fig. 5. Removable die preparation on the cervical limit

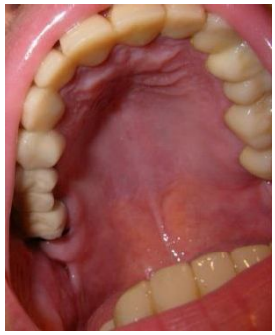

Fig. 6. Temporary bridges - intraoral view

For melting and precise castings **Feguravest Ultrafine** mass, liquid + powder (specific to *Cr - Co* dental alloy *Kera C* base to made metal parts of prosthesis) was used.

The wax-up preparation for investment was realised attaching casting channels, with correct dimensions and position in order to assure a complete filling of the mould. After alloy casting, on the framework surface there are significant quantities of adherent mass Feguravest Ultrafine and a layer of metal oxides formed during melting and casting.

To remove these forms the castings were sandblasted- operation which consists in jet projection of sand sized at 150 μm at a pressure of 3-4 atm, on its surface.

After processing and adaptation metal frameworks to model it followed their checking into oral cavity of the patient to control them adaptation on organic substructures and marginal fit (Fig. 9).

In order to ensure a high chemical bond with porcelain, metal infrastructure should be conditioned by sandblasting procedure (with a solid aluminium trioxide granules at 110 - 150μm, at an angle of 45 degrees and a pressure of 4-6 Barr for about 4- 6 seconds per part sandblasted) and ceramic oxidation oven at a temperature of 980° C, without vacuum, followed by washing with a jet of pressurized water vapours (steamer).

Esthetical component of crowns and bridges it was made with IPS InLine, a ceramic system (Ivoclar Vivadent), which includes a diverse range of powders: Dentin, Deep Dentin, Occlusal Dentin, Incisal, Transpa Incisal, Cervical Incisal, Transpa, Gingiva, Intensiv Gingiva, Mamelon, Add-On Margin, Dentcisals.

The choice of material was based on biomechanical and aesthetic parameters, which allowed morphological reconstruction, restoration and maintenance of vertical dimension of occlusion.

Component plating technique is made by layering technique. The first layer is an opaque called *wash-opaque white* that must be applied in a very thin layer, carefully to not touch inside the capes, and which is sintering at 960°C temperature.

Fig. 7. Metal framework wax-pattern

Fig. 8. Metal infrastructure after sandblasting

Next application consist in another 2 -3 layers from Opaque, at colour A3, established in clinical dental office and mentioned on laboratory data chart (Fig. 10).

In our case, for dental morphology edification we used the following layers of ceramics: Deep Dentin (A3) Dentin (A3), Opal Effect (2) and Transpa Incizal TI 2. The first dentin layer mass applied over Opaque is *Deep Dentin*, A3 colour that synterize at 910°C temperature. After each sintering (in ceramic furnace **Programat P300** - Ivoclar Vivadent) layer deposited is washed on steamer to remove oxides formed inside skeleton (cape) and traces of fat from handling and processing with micro motor and turbine water.

The second layer consists of *Dentin* porcelain (colour A3), *Opal Effect 2* and ***Transpa Incisal TI 2***, which is sintering together at 900°C. To compensate contractions occurred during sintering ceramics mass it is oversized in every sense applied. To obtain morphological individualization marginal ridges, cusps, lobes growth design can be achieved with internal makeup perfecting esthetical goals.

After removing from oven it can be find some small deficiencies regarding the shape and colour of prosthetic denture. Using different diamond grit burs and separators discs through successive processing, the correction is achieved on occlusal surfaces, occlusal apertures and incizale edges.

The intraoral examination phase (*biscuit sample*), dentist analyse: curves recovery and occlusal restoration contacts, aesthetic function recovering, and with patient agreement any corrections on the shape, colour or size of teeth (Fig. 13). It is the last stage which permits our action to achieve optimal morphologically and functionally [4, 5].

After morphological corrections it can be made fine colour individualization (makeup) with *Stain and Shade* final stage targeting the application **glazing layer**. The **goal** is to create a transparent glazing layer, glossy, very thin, which prevents absorption of fluids from the oral environment and provide a sense of naturalness specific in natural teeth. Glaze is sintering at a temperature lower than that ceramics were sintered at 840-850°C, also in vacuum conditions.

Fig. 9. Adaptation control of metal infrastructure

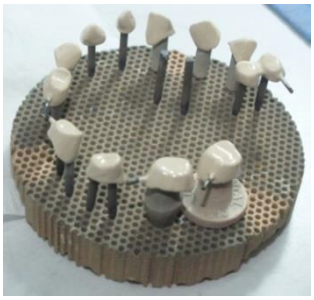

Fig. 10. Opaque layers application

Fig. 11. Morphological individualization building

Fig. 12. Achievement corrections stage

Fig. 13. Intraoral verification

Fig. 14. Glazing

Fig. 15. Final Appearance

Metal oxide formed inside the cape cleaning was performed with SANDBLASTER using aluminium oxide particles at 110-150μm, after the prosthetic devices were sent to dental office for verification and cementation in the mouth.

For outcomes conservation and clinical longevity providing of prosthetic rehabilitation it was necessary to make occlusal trays to be worn during the night in order to prevent bruxism resettlement effects. Although not treat bruxism, there are used in the treatment of dysfunctional syndrome, aimed at suppressing side effects, eliminating premature contacts and occlusal interferences.

CONCLUSIONS

Complex oral rehabilitation is based on holistic approach principle in patient with a diverse pathology, in both stages: assessment and diagnosis phase and during the development of the therapeutic algorithm.

The patient is in an active partner that must be trained in setting future specific parameters rehabilitation; patient participation is more evident in the time of diagnostic models, to provisional prosthetics, establishing chromatic parameters of ceramic component.

Rehabilitation in this case and vertical dimension of occlusion restoring was achieved both by applying metal-ceramic prosthetic substitute and by identifying and eliminating stress factors.

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