

PREPARATION OF ICD AND OVERDENTURE IN PATIENTS WITH CUSHING'S SYNDROME: FIVE-YEAR FOLLOW-UP

PREPARO DE PTIE OVERDENTURE EM PACIENTES COM SÍNDROME DE CUSHING: CINCO ANOS DE ACOMPANHAMENTO

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ABSTRACT

The aim of this study is to report a clinical case of a patient with Cushing's syndrome, low self-esteem and need for oral rehabilitation. A 50-year-old female patient with hypercortisolism sought care at School of Dentistry of the Federal University of Minas Gerais. During anamnesis, the patient reported painful symptoms and mobility of the upper and lower teeth. On clinical examination, absence of many teeth were observed, periodontal disease and caries lesions. After discussion of the case, the planning involved the extraction of all teeth, and the preparation of Maxillary Immediate Complete Dentures (ICD's) and Immediate Mandibular Implant-retained Overdenture (IMIO). The treatment proposed allowed the restored aesthetics, phonetics and chewing.

UNITERMS: Cushing's syndrome. Complete Dentures. Overdenture.

INTRODUCTION

Cushing's syndrome, or hipercortisolism, is a disease caused by the high concentration of the cortisol in the body. The causes for this syndrome may involve endogenous or exogenous factors, in which the excess of glucocorticoid drugs is included. This is a frequent cause, which makes it necessary to obtain the patient's medication history in the anamnesis¹. Endogenous Cushing's syndrome is the result of excessive cortisol production by the adrenal glands, and, consequently, an exaggerated amount of this circulating hormone in the blood^{2,3}. This factor occurs by loss of the normal mechanism of hypothalamus-pituitary-adrenal axis regulation. This axis is regulated by the endogenous cortisol, in a mechanism of negative feedback, which, when at normal levels, provides conditions for the body to respond to different stimuli⁴.

There are several clinical manifestations of Cushing's Syndrome, which involve centripetal obesity, supraclavicular gibbosity, full moon face, pink or purplish skin striae, hyperpigmentation, facial plethora, hirsutism, acne, decreased linear growth in children, proximal muscle weakness, emotional lability, psychosis, cognitive deficit, nephrolithiasis, glucose intolerance or diabetes, hypertension, decreased libido, delayed puberty, infertility, insomnia, and osteopenia, osteoporosis and increased number of infections⁵. These characteristics are related to the oral cavity and its structures. In some cases, clinical signs may be

confused by simple obesity, so the most reliable signs to distinguish these two conditions are thin skin, easy bruising, proximal myopathy, and decreased linear growth in children^{2,1}.

The clinical manifestations of Cushing's syndrome imply a decrease in the individual's self-esteem, and, in addition, and unsatisfactory smile contributes to further diminish this feeling of well-being with the body itself. The smile is an important part of an individual's self-esteem and influences their insertion in society⁶. However, its aesthetics can be compromised due to numerous factors, such as advanced stage caries, periodontal problems, infections, traumas, and dental loss. For patients with severe dental and periodontal involvement, who will lose their remaining teeth, an alternative is immediate complete dentures (ICD's). This treatment approach ensures the recovery equilibrium of the stomatognathic system without altering the patient's social interaction⁷.

The immediate complete dentures promote patient's rehabilitation concomitantly with dental element extraction. The prosthesis is made before the extractions of the patient's natural teeth⁷. It promotes the reduction of alveolar bone resorption, after tooth extractions, which makes the alveolar ridge more satisfactory than would be obtained with normal healing⁸. Therefore, there is a greater preservation of the alveolar bone, which favors the subsequent retention of complete dentures, or the placement of the implants, as in the case of implant-retained overdentures.

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According to The McGill Consensus Statement on Overdentures⁹, there is evidence that a 2-implant overdenture should become the first choice of treatment for the edentulous mandible. In the case of edentulous patients without support area to promote adequate retention of dentures, treatment using osseointegrated implants located in the anterior region of the mandible is recommended, which increases the retention, support and stability of dentures¹⁰. Following this pattern, the use of overdentures on implants is increasing, since they present a high percentage of clinical success, lower cost, among other advantages^{10,11,12}.

Therefore, overdentures act as mucosupported and implant-retained dentures, having their predominantly mucous support, but the retention and stabilization of the device are widely improved through fixation to implants¹³. Besides that, it has a great advantage the issue of hygiene, after all, provides greater ease and convenience, and an increased patient's compliance¹⁰.

In this context of difficulty in remaining toothless during the period of tissue healing, and the difficulty of obtaining good retention and stability in complete mandibular dentures, the aim of this study is to report a clinical case with five years of follow-up, in a patient who presents Cushing's syndrome as a systemic condition. The procedure was executed in an assistance project offered by the School of Dentistry of the Federal University of Minas Gerais. This project aims to rehabilitate low-income patients with severe aesthetic and functional impairment, using immediate complete denture (ICD) for the maxilla, and overdentures retained by two implants, in immediate load, for the mandible.

CASE REPORT

A female patient, 50 years old, reported being unsatisfied with her smile (Figure 1), and therefore, sought care at the School of Dentistry of Federal University of Minas Gerais. During anamnesis, the patient reported that she has a systemic condition known as Cushing's syndrome, having been submitted to resection of the pituitary adenoma two years earlier.

On intraoral examination was observed a severe both dental and periodontal involvement, with loss of several teeth, presence of unsatisfactory removable temporary dentures, presence of carious lesions, mobility, a large amount of plaque, dental calculus, and periodontal pockets (Figure 1). As a complementary examination, a panoramic radiograph was requested, from which it was possible to confirm the need for extraction of all the teeth (Figure 1). The execution of the Immediate Complete Dentures for both arches was planned and, after tissue healing, installation of two implants between the two foramina area and capture of the mandibular denture as an overdenture in immediate load¹⁴.

The patient agreed with the established planning that was properly explained to her, read, and signed the Free and Informed Consent Term, as well as the Image Use Authorization Term. She is authorizing the beginning of the work and the scientific dissemination of the different phases of her treatment. The consent and participation of her were optional. Research and dissemination of the results of the project were duly approved by the UFMG Research Ethics Committee (Protocol number: 20532213.5.0000.5149; approval number: 434.361).

The clinical procedures strictly followed the care protocol recommended in the project¹⁵, starting with the adequacy of the oral environment, through the removal, as far as possible, of plaque retaining factors. Subsequently, all posterior teeth were extracted in both arches. All surgical procedures were preceded by intraoral antiseptics, performed with 0,12% chlorhexidine digluconate for one minute, followed by perioral asepsis with polyvinyl pyrrolidone-iodine (PVPI) with 1% active iodine, and assembly of sterile operative fields, in addition to prophylactic antibiotic therapy with 2g of amoxiciline 1 hour before the procedure. The anesthetic solution used was Articaine 4% + Epinephrine 1:100,000 (DFL®, Rio de Janeiro, Rio de Janeiro, Brazil), for presenting a great diffusion for soft and bone tissues, and a very fast onset of action in the sensory block¹⁶.

After of initial tissue healing of the posterior regions (21 days), it was started the immediate prostheses manufacture. The molding was performed with metal trays of stock type Vernes (Tecnodont®, Indaiatuba, São Paulo, Brazil) and irreversible hydrocolloid-alginate (Jeltrate-Dentsply®, Vila Gertrudes, São Paulo, Brazil) to obtain study models in type III stone plaster (Asfer® São Caetano do Sul, São Paulo, Brazil). On the models, individual trays were made in self-polymerizable acrylic resin (JET®, Campo Limpo Paulista, São Paulo, Brazil). For the functional molding of the arches, low fusion godiva was used for peripheral sealed (Godiva Exata; Nova DFL, Rio de Janeiro, Rio de Janeiro, Brazil) and irreversible hydrocolloid-alginate (Jeltrate; Dentsply®, Vila Gertrudes, São Paulo, Brazil) to shape the other regions of the arch. After obtaining the functional models in type III stone plaster (Asfer®, São Caetano do Sul, São Paulo, Brazil), test bases were made in chemically activated acrylic resin (JET®, Campo Limpo Paulista, São Paulo, Brazil) and wax planes (7 wax, Polidental®, Cotia, São Paulo, Brazil). The wax planes were adjusted, intermaxillary relations were recorded (vertical dimension of occlusion and centric relation) and the models were assembled in a semi-adjustable articulator (Bioart®, São Carlos, São Paulo, Brazil). It was defined the size, shape, and color of the teeth to assemble, using the mold chart (Biotone-Dentsply®, Vila Gertrudes, São Paulo, Brazil). After the aesthetic and functional proof of artificial teeth (only in the posterior regions), the prostheses were completed by removing the remaining teeth present in the models,

complementing the assembly in the anterior region (saddle and teeth), and pressing in muffles.

When the prostheses were installed in the oral cavity, they received antiseptics, using 2% chlorhexidine for 30 minutes. The anterior superior teeth were extracted with appropriate bone adjustments, followed by the incorporation of the two immediate complete dentures, and the appropriate adjustments (Figure 2). The patient was instructed not to remove the prostheses for 24 hours, to control the post-surgical edema, at the risk of not being able to fit them anymore. Re-evaluations were performed with 1, 3, 7, 14, and 30 days, making the necessary adjustments.

After the 3 months, relining were performed with thermally activated acrylic resin (JET®, Campo Limpo Paulista, São Paulo, Brazil) which are usually necessary in cases of immediate denture to obtain a better adaptation to healed ridges (Figure3). For this purpose, the prosthesis was used as an impression tray and the polyether (Impregum™ Soft 3M-Espe, Sumaré, São Paulo, Brazil) was used as molding material. After casting of type III stone plaster (Asfer®, São Caetano do Sul, São Paulo, Brazil), the prostheses were sent to the laboratory for repressing. The relining was made in maxillary and mandibular prostheses. The patient was offered disposable face masks to be used until the prostheses could be reinstalled, which happened within 36 hours.

Two implants were then installed between the two foramens region. After opening the mucoperiosteal flap, two surgical sites of 15mm depth were prepared following a sequence of surgical cutters (Surgical Kit - Neodent®, Curitiba, Paraná, Brazil): a spear, 2mm, pilot 2/3, 2,8mm and 3mm, mounted contra-angle (Koncept 20:1 contra-angle reducer - Kavo®, Berlin, Germany) and implant-motor (Koncept Surg Surgical Motor - Kavo®, Berlin) under constant irrigation with saline solution. Then, the implants (Titamax TIC Cortical - Neodent®, Curitiba, Paraná, Brasil) with external connection, with 3,75mm in diameter and 15mm in length, were installed with a manual ratchet (Surgical Kit - Neodent®, Curitiba, Paraná, Brazil). As good primary stability (60Ncm) was achieved in both implants, the mandibular prosthesis was captured as an overdenture in immediate load. The retention system chosen was the Equator (Neodent®, Curitiba, Paraná, Brazil), consisting of the metal trunnion and polymeric ring. Thus, using a tungsten drill (Maxicut PM - Edenta®, Saint Gall, Switzerland), the space opening was relocated on the inside of the prosthesis to accommodate the metal capsule containing the polymeric retaining ring, captured with chemically activated acrylic resin (JET®, Campo Limpo Paulista, São Paulo, Brazil).

The patient received the orientations, mainly regarding the correct way to remove and place overdenture, as well as the care to be taken with the hygiene of the implant units and prosthesis. However, she was again instructed not to remove the prosthesis in the first 24 hours after the surgery. The patient was

re-evaluated after one and three days for adjustments, and the sutures were removed after seven days (Figure 4). After fifteen days, the patient no longer presented any signs of edema or another discomfort (Figure 4). After thirty days, the patient was re-evaluated and the pink polymeric rings were replaced by lilac rings, according to the manufacturer's recommendations, which showed greater retention.

The patient was included in the maintenance program linked to the Project, for clinical evaluations and polymeric ring exchange, when necessary, due to their natural wear and tear, being monitored every six months, up to five years. After this period, the prostheses were again relining with polymerized thermic acrylic resin (JET®, Campo Limpo Paulista, São Paulo, Brazil). This procedure was performed to reduce the costs to the patient.



Figure 1: Initial situation of the patient's smile when she arrived at School of Dentistry, UFMG (A), her intra-oral clinical situation (B) and her initial panoramic radiography (C), showing great bone loss, and verifying the need for removal of all the teeth.



Figure 2: Upper and lower ICDs incorporated into the respective alveolar ridges, and the result of the aesthetics of the patient's smile after the incorporation of the ICDs.



Figure 3: Maxillary (A) and mandibular (B) alveolar ridges after the healing period, and panoramic radiography representing the alveolar ridges after the healing period (C).



Figure 4: Re-evaluation after 14 days and absence of edema.



DISCUSSION

Due to the systemic condition of the patient, it was necessary to adopt a specific protocol for this case. According to Newell-Price *et al.*⁵, the patient with Cushing's syndrome has a higher susceptibility to infections and should be treated as an immunosuppressed patient. Therefore, prophylactic antibiotic therapy was indicated before each surgical procedure, with 2g of amoxicillin 1 hour before, in order to avoid a possible postoperative infectious condition⁴.

Besides that, as Cushing's syndrome is characterized by excess blood circulating cortisol hormone², care should be taken with the administration of glucocorticoid drugs (such as dexamethasone, prednisolone, hydrocortisone and betamethasone) postoperatively⁴. Therefore, it was decided not to administer glucocorticoid drugs in the postoperative period, to avoid worsening in the patient's systemic condition.

Although the project has as a protocol the installation of implants concomitantly with extractions, considering that the patient had an important systemic condition, the treatment of choice was to perform the extractions, install a complete immediate mandibular denture, wait for a healing time (4 months), to later install the implants on immediate load. The maxilla and mandible immediate complete dentures were

installed immediately after the extractions so that the patient would not be edentulous. The ICD, in addition to meeting the aesthetic needs of the patient, also allows the maintenance of the bone remnant, allowing the future installation of implants⁸ and the control of bleeding and edema. Besides that, there are also other advantages, as the maintenance of the facial appearance, and the protection of the surgical wounds against physical aggression and exogenous infections, promoting a faster healing¹⁸.

The decrease in bone resorption occurs because the placement of the immediate complete denture deforms the occlusal ridge, stimulating osteogenesis, and, at the same time, decreasing the osteoclastic action at the alveolus⁸. This favors post-surgical clot-induced bone healing⁸ and provides physical protection to alveoli against harmful forces of the oral cavity. In addition, it replaces the support, which was previously provided by the teeth, tongue and jugal mucosa, preventing these muscle masses from causing excessive forces on the alveoli, and thus allowing greater fibromucosal healing, and greater calcification of the bone cortical¹⁹.

The immediate complete denture also has as an advantage the maintenance of the occlusion vertical dimension and social interaction, in addition to better postoperative, since the placement of the denture on the healing area ensures as follows: protection to surgical wounds, control of bleeding and edema, allows the installation of artificial teeth in a position similar to the remaining teeth, and a shorter period of diet change²⁰, since the patient won't be completely edentulous. Besides that, it promotes protection to the temporomandibular joint²¹, and prevents the collapse of the facial musculature⁸, ensuring a better aesthetic. According to Meleti *et al.*⁷, after the installation of an immediate complete denture, the patient must wait at least 4 to 6 months to make the definitive denture.

After 3 months, the procedure was continued, and then, two implants were installed between the two foramens of the mandible. In this case, 60 N.cm of initial locking was reached, which allowed the installation of the overdenture in immediate load.

With regard to masticatory and functional activity, overdenture has several benefits, since, to restore effective chewing, it is essential that there are a maximum fixation and stability of the denture apparatus. Thus, this modality is satisfactory with regard to aesthetic, phonetic, masticatory aspects, and the integration of this patients into society^{11,12}. Thirty days after the procedure, the patient did not present problems in the implants installed, and then, was included in the maintenance program, being evaluated every six months, and changing the polymeric rings when necessary, according to the manufacturer's recommendations. After five years of each six months evaluations, her last evaluation was carried out. Clinically, the implants were in excellent condition (Figure 5). Radiographically, little resorption of the alveolar ridge was observed (Figure

6). However, it was verified the need for relining of the prosthesis due to the physiological resorption of the fully edentulous ridge.

The patient was very satisfied with the aesthetic and functional result obtained and reported a great improvement in her quality of life. Treatment with ICD and subsequent rehabilitation with the upper complete denture and mandibular implant-retained overdenture were satisfactory regarding the improvement in the quality of life of patients treated with these therapeutic modalities, which corroborates previous studies^{22,23}.

This type of approach, which combines ICD and mandibular implant-retained overdenture is extremely satisfactory in the rehabilitation of edentulous arches. Because, in addition to being fast and with a low cost, it is also able to restore masticatory capacity, phonetics, aesthetics, and lip muscle support. However, a previous individualized planning, according to the patient's needs, is indispensable. The patient then becomes able to continue living normally in society, besides presenting the advantage of comfort and safety provided by the mandibular prosthesis retained by implants. The implants are installed in a position that allows a more sophisticated rehabilitation, such as the installation of new implants and the manufacture of a fixed implant-supported denture, if it is the patient's will, and is within its anatomical and financial possibilities^{24,25}.

It is important to emphasize that ICD's should be considered as temporary work, and need to be replaced or relined in a short period of time. They serve only as a transition between the removal of the teeth and the definitive prosthetic work, with the purpose of not leaving the patient edentulous for any period. However, in some cases, it is observed that it is possible to perform laboratory relining (usually after three months) and transform the provisional prosthesis into definitive. This represents an important advantage from the financial point of view since the project treats patients referred from the Brazilian health system, most of which are middle and low income²³.

There is a lack in the literature to establish a protocol for the dental management of patients with Cushing's Syndrome, which suggests that there should be more studies and case reports in the area. However, the dentist must always be aware of the patient's medical history¹ and avoid prescribing corticosteroid medications. In addition, it is important to adopt an anxiety reduction protocol⁴, to avoid clinical situations such as high blood pressure during the procedure. Regarding the treatment modality adopted, with the ICDs and posterior mandibular overdenture, it was the best option for preserving the patient's bone, which, due to her systemic condition, has greater osteoclastic activity, and susceptibility to osteoporosis^{26,5}.

According to studies already carried out in the project in question, excellent results are observed in the survival rate of implants and the success of the treatments performed. There is also great satisfaction

on the part of the patients treated, and a significant improvement in their self-esteem and quality of life was documented^{23,25}.



Figure 5: Situation of implants after five years of evaluation.

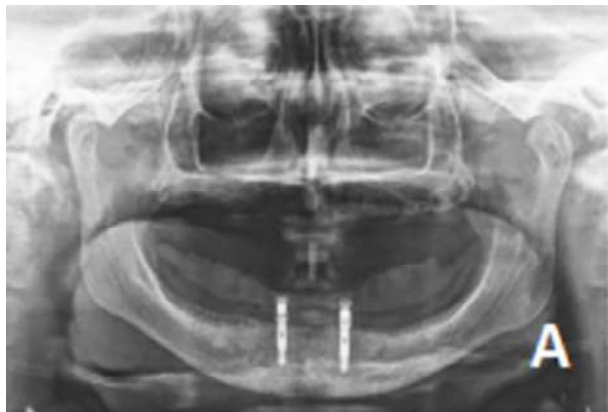


Figure 6: Radiographic evaluation after five years, showing little mandibular bone loss; and the aesthetic result of rehabilitation.

CONCLUSION

The protocol used in the present case (preparation of maxillary and mandibular ICD, and subsequent placement of mandibular implant-retained overdentures) is an adequate and satisfactory approach for patients with Cushing's syndrome, with severe dental involvement, and who will have all their teeth extracted.

RESUMO

O objetivo desse estudo é relatar um caso clínico de uma paciente com síndrome de Cushing, baixa autoestima e necessidade de reabilitação oral. Paciente do sexo feminino, 50 anos de idade e com hipercortisolismo, procurou atendimento na Faculdade de Odontologia da Universidade Federal de Minas Gerais. Durante a anamnese, a paciente relatou sintomas dolorosos e mobilidade dos dentes superiores e inferiores. No exame clínico, foi observada a ausência de muitos dentes, doença periodontal e lesões cáries. Após a discussão do caso, o planejamento envolveu a extração de todos os dentes, e o preparo de Prótese Total Imediata maxilar (PTI), e *Overdenture* Implantorretida Imediata mandibular. O tratamento proposto permitiu que restaurasse a estética, fonética e mastigação.

UNITERMOS: Síndrome de Cushing's. Dentura Completa . Overdenture.

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