



Case Report

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Bone regeneration after enucleation of periapical lesion and bone graft: description of clinical case of dental implants

Gianandrea Ribeiro Wotfe¹, Felipe Jorge Magaldi², Adriana Serpeloni dos Santos³, Claudio Renato Jordão⁴, Alberto Noriyuki Kojima⁵

1 Periodontics specialist (UNISA, Sao Paulo/Brazil), Independent researcher, Private Practice (Sao Paulo, Brazil), Member of International Academy for Laser in Dentistry Sao Paulo, Brazil

2 Implant dentistry specialist (FAPES, Sao Paulo), Assistant Professor of Department of Implant dentistry (HOFI Brasil, Sao Paulo)

3 Dental Prosthesis specialist (UNISA, Sao Paulo, Brazil), Coordinator professor in residency of International Academy for Laser in Dentistry (ABO, Bahia/IALD), International certification in Laser in Dentistry (IALD)

4 Professor Centro Paula Souza do Estado de São Paulo – ETEC Philadelpho Gouveia Netto – Department of Dental Prosthesis

5 Assistant Professor, São Paulo State University/UNESP, Department of Dental Material and Prosthodontics (ICT São José dos Campos)

Abstract

With the intention of minimizing the impacts of procedures in the physical and psychological health of patients with dental absences, we applied the use of techniques already quite experienced and aimed at reducing as much as possible the treatment time in each of the stages involved. Implants placed in function immediately after installation (immediate load), weeks after surgical intervention (early loading) or late, walk towards the patient's health return proposals. The determination for each operative step in the planning involved not only what it relates to the time of treatment, but it should always be considered to evaluated profile of each patient when detailed clinical examination and consistent treatment plan for each individual. Determining factors were considered in the choice of procedures: age, general health condition, functional aspects of the stomatognathic apparatus and traits of psychological behavior affected by the condition. consistent treatment plan for each individual. Determining factors were considered in the choice of procedures: age, general health condition, functional aspects of the stomatognathic apparatus and traits of psychological behavior affected by the condition

Keywords: Rehabilitation, Apical Injury, Periodontal Disease, Bone Graft.

INTRODUCTION

Returning functional and aesthetic stability to individuals who have lost their masticatory capacity has always been one of the great challenges of dentistry. The incessant search for oral rehabilitation combined with technological evolution in the field of prosthesis and implant dentistry, brings to the muco-supported prostheses a way to fixed prosthetic parts on a prefabricated metallic framework by geographically divided implants installed in both dental arches. For this technique, we give the name of "protocol", and it's has been widely disseminated, as it allows the stabilization of the loss of alveolar bone structure, as well as provides greater comfort and safety of use of the pieces, returning quality of life and confidence to patients.

OBJECTIVE

The objective of this work was to present a rehabilitation treatment where the aesthetic, functions and also the emotional aspects of a 57-year-old patient were recovered, through the installation of 6 implants in the maxilla region and 4 implants in the mandible and subsequent installation of two protocols.

***Corresponding author:**

Gianandrea Ribeiro Wotfe

Periodontics specialist (UNISA, Sao Paulo/Brazil), Independent researcher, Private Practice (Sao Paulo, Brazil), Mmber of International Academy for Laser in Dentistry Sao Paulo, Brazil
Email: grwotfe@gmail.com



Figure 1: Fotos iniciais

CASE REPORT

During the first assessment, the patient did not present any systemic condition unfavorable to planning. Although he was a smoker, reporting a consumption of 3 packs of cigarettes per day.

The patient reported a low self-esteem behavior, much of which was credited to his personal image being impacted by facial changes caused by tooth loss, and was dissatisfied with the current situation of his teeth.

After detailed clinical examination, we found an extensive loss of elements in the upper arch, in addition to residual root in the tooth region 17. The region of elements 24 to 26 presented fixed prosthetic piece with a related periapical lesion in the retainer crown on 24, and considerable bone loss around this root. Element 21 was inclined for buccal in excess, with marked wear due to the position of occlusion with its antagonists. This condition was also observed in elements 22 and 23.

In the occlusal evaluation, there was loss of vertical dimension around 5mm, mandibular protrusion, maxillary atresia, and retrognathism, showing a very decompensated profile in the mandibular maxillary relationship. (FIG 1).

In the evaluation of the lower arch, it was clinically observed mobility of grade II and III between canines and radiographic examination, an extensive periapical lesion were found, compromising practically all lower dental elements, except for elements 43 and 46, which, otherwise, would also need periodontal treatment. In addition, masticatory overload and occlusal decompensation were related to impaired periodontal support in the entire lower arch.

Initial examinations were requested for evaluation and planning of the case, including panoramic radiography and computerized tomography (I-Cat) that would support the necessary detailing for the various stages of the treatment that would be proposed. (FIG. 2)

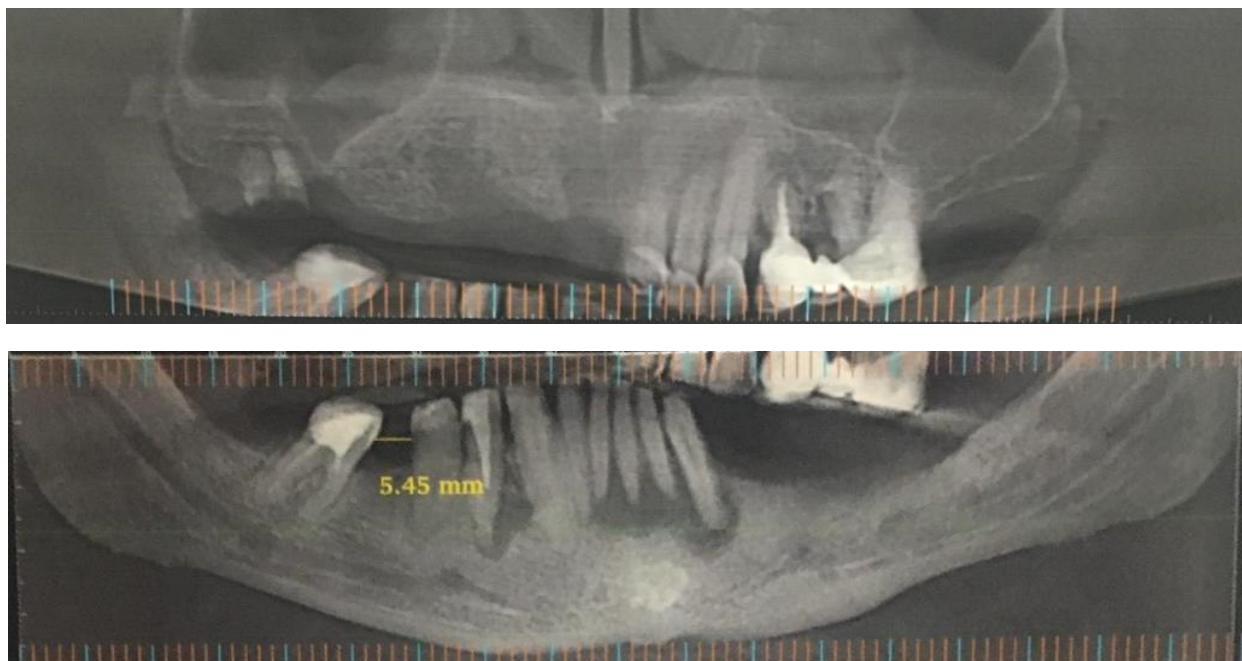


Figure 2: Image of first assessment (upper and lower arches)

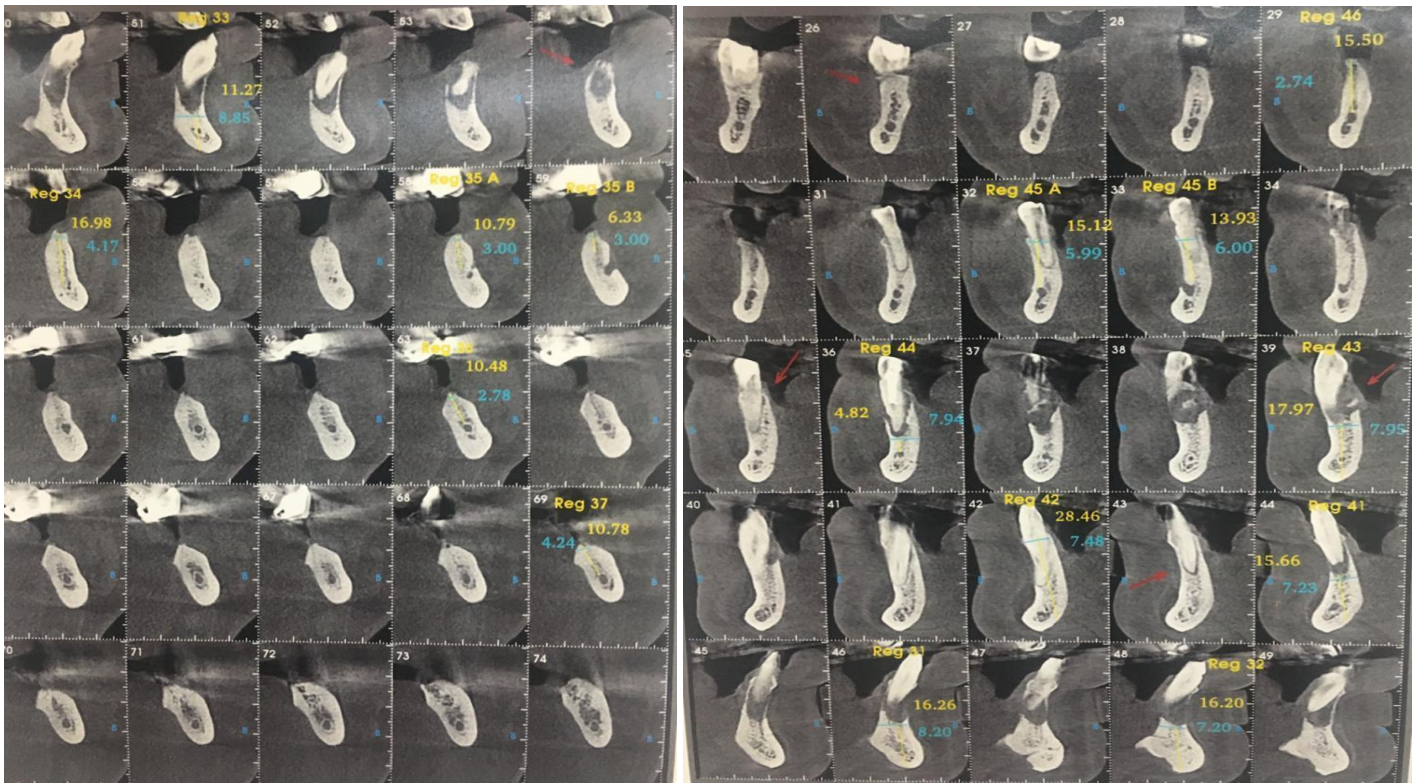


Figure 3: Detail of ICat images from first assessment and periapical lesion in anterior mandibular region.

After collecting all data in clinical and imaging exams, both panoramic radiographic and computerized volumetric tomography (II-Cat®), prosthetic and surgical planning was planned to perform a protocol in the upper and lower arches [15].

Complete removal of all dental elements was performed, also the complete enucleation of the existing lesion (FIG. 3). To promote guided bone regeneration, heterogenous lyophilized grafting (Xenogen), from the manufacturer *Critéria Lumina Pórus*®, was used during the procedure in the presentation of coarse granulation (2000 to 1000 micro) and in a combined placement of bovine biological membrane, *Critéria Lumina Coat*®. In this phase, the objective was to allow the recovery of the bone framework [7] initially with the formation of osteoid tissue, and consequent maturation of the same for future installation of implants.

In the immediate postoperative time, the patient was resistant, not accepting to exempt himself from the use of the dentures for the heal period, besides having reiterated the real importance of remaining without smoking during this period.

In the initial tomographic evaluation, in an attempt to offer some comfort to the patient, we opted for the installation of immediate temporary implants brand *Dentoflex Solid*® of sizes 2.6 mm in diameter by 13 mm, which were positioned in the mandible (2 units) and maxilla (3 units). (FIG. 4 e 5). Over those implants were installed total dentures over the o'ring retention in a pattern for *Overdenture* pieces. The main objective during the immediate postoperative phase was, in addition, to protect the wound from masticatory trauma, and to minimize the contact of the operated site from smoke aggression [22]

A healing period of 12 months was waited, and in the subsequent computerized tomographic evaluation, it was possible to notice the complete bone repair in the region of the lower arch lesions, as well as the loss of a temporary implant in the mandible, a fact irrelevant to the final result and under expectation.



Figure 4: Immediate temporary implants on Maxila

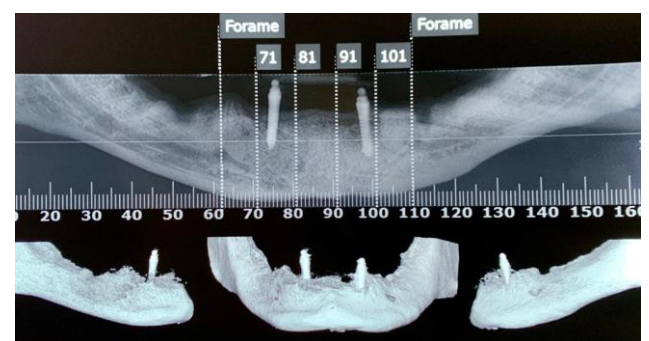


Figure 5: Control image after extractions, bone graft and temporary implants

Following the planning of the second stage, surgery was then performed to place 4 implants in the lower region, selecting the positioning between the mental nerve foramens, and 6 implants in the maxilla region. The implants selected were of the *SIN* brand® HE *Strong SW plus*® model (with platforms of 3.75 and 4.4 mm and lengths ranging between 10 and 13 mm, except in position 87 in which the Model *SIN HI Strong SW*® was selected, all of them with surface treatment (hydroxyapatite blasting) and configured for an early load (two months according to the manufacturer). (FIG. 6)

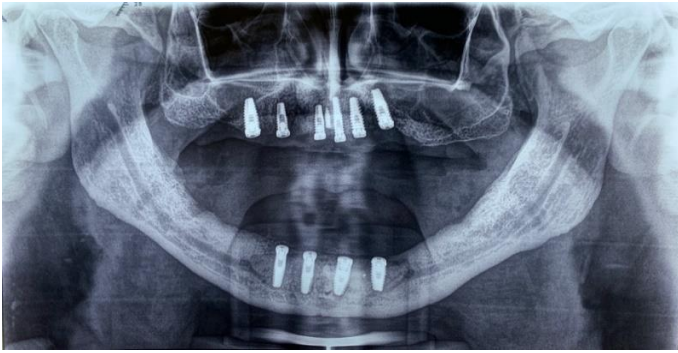


Figure 6: Placement of 10 dental implants

After completion of the surgical phase, waited for 60 days for the opening and beginning of tissue conditioning consequently of the prosthetic phase.

In the following appointment after the reopening and placement of the healers, the first step of the prosthetic phase was carried out. It was followed with transfer impression using an open tray technique with the joint of the impression, pillars by a wall composed of weft floss which supported the retention of resin type *Patterson®*, *GC America*, stabilizing the position of all components during the procedure of impression.

The impression technique performed was chosen based on ease of execution, dimensional stability and accuracy, in addition to the associated costs. For this appointment, a mixed impression technique was used, with condensation silicon in a light and dense combined form (Sandwich technique) using *Optosil®* and *Xantopren®* by *Kulser*. In the same day, the reference of facial and functional measurements were also recorded for the assembly of the models in semi-adjustable articulator.

After repositioning the healers, the temporary prosthetic parts were rebased with resilient and soft material (*Quick-line®* - primer and liner, *Sterngold®*) with the objective of offer an extra comfort to the patient. In addition, to the modification of the temporary dentures have a better attachment over the temporary implants and be supported by the intermediary components. Despite presenting stability at first week, in the following appointments, the patient back with a report of insecurity

during mastication, relating instability and sensation of loosen dentures. Thus, it was choose to connect it temporary to the new lower implants, and in the antagonist arch, in three upper implants, all of them using an UCLA-type connection as a substitution like an additional retention to the mucous support.

After all were taken to ensure the healing and proper remodeling of soft tissues surrounding the implants, the step of construction of the dentures was started. (FIG. 7)

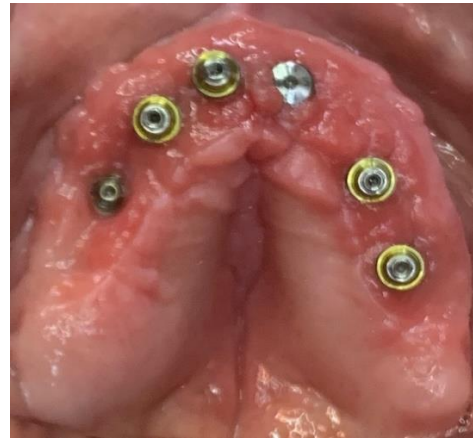


Figure 7: The proper remodeling of soft tissues surrounding the implants

In the laboratory phase, the smelting of the bar was made in Ni-Cr alloy (Liggan N Ni®) and the proves the metallic structure done. At each appointment, there was important to give attention to the preservation of space between and the lower arch and the metal framework, taking care to avoid the over compression of the soft tissues. It took some attempts for the functional and aesthetic proves to ensure not only the restoration of the masticatory capacity, but also the recovery of the phonetics functions by the patient.

Concluded the steps of functional tests, both dentures were installed in the upper and lower arches. (FIG. 8)



Figure 8: Dentures, lower and upper arches.

Subsequent visits served as a way to reassess possible adjustments, reinforce hygiene instructions, as well as promote the patient's rationing and adaptation to this new functional condition. The objective of this work is to show a successful solution to the case of a patient who came to us with low self-esteem and much credited to his personal image being impacted by facial changes caused by tooth loss and also by the

current resulting appearance in the set. The final result of treatment and the positive response of the patient in the recovery of their physiological and psychological functions were the most significant trait reported. The change in behavior and social presentation were noticed by family and friends, generating full patient satisfaction with the rehabilitation process. (FIG. 9).



Figure 9: The final result of treatment and the positive response of the patient.

DISCUSSION

Among the areas that have advanced the most in dentistry in recent years, certainly is Implant Dentistry and highlighting all regenerative techniques¹¹ applied to complex rehabilitation treatments. Much of this advance is due to the professional's ability to identify possible indications for protocols on implants, being more conscious and trained to indicate this type of treatment. Individuals who throughout their lives have undergone treatments that are not always compatible with their needs are generally the main candidates. Among those, we can mention endodontic involvements and their complications that may evolve to apical cysts impairing bone support; periodontal diseases, neglected in their mutilating potential over time, as well as prosthetic treatments capable of provoking new and varied undesirable mechanical actions, compromising the dental elements and also the alveolar ridge [19,17,4,3,12].

The citation of bone losses caused by periapical lesions, a silent development that become like root cysts, is certainly one of the most frequent causes for the loss of supporting tissues [19]. Large losses are also observed in the regions of fractures, resulting from super instrumentation of root conduits, with risk of perforations that feed such lesions, having in most cases, inflammatory and infectious origins²¹ in addition to the very frequent root fractures. Fact is, tissue losses are a fundamental chapter in the planning of rehabilitations, and mastering this step confers predictability to these rehabilitations [2].

Seeking for a solution to such challenges, the regenerative techniques of grafting [11] that, together with the technology inserted in the manufacture of the implants themselves, add efforts to not only restore lost tissues, but also preserve the remaining natural structures of the diseases previously reported [5, 8, 20].

In this dynamics of planning and prognosis, patients should be instructed as to the risks and limitations of their cases individually, conditions that cross systemic issues of general health, such as preexisting diseases (hypertension, diabetes, osteoporosis) or deleterious habits (smoking, perioral habits, postural, alcoholism) [12, 16, 22]. Factors linked to the points above, local and general should be carefully evaluated by professionals so they do not become potential risks for future complications or even failure of treatment. In attempt to reduce risks, treatments can be seen, in general, developed in stages and in very specific steps.

Not less important, is minimize the impacts on the physical and psychological health of patients. Currently, there are techniques where the spent time in each of the stages is reduced, ranging from the

immediate activation of the implants, to weeks or months after the installation surgery. Often implants are activated immediately after installation (immediate load); weeks after surgical intervention (early loading) or in a traditional way in months (late load). Many professionals are moving towards proposals for the recovery of the patient's health in the shortest time as possible. The definition of each operative step is directly linked to the treatment planning for each case, considering the patient's profile, systemic and local condition, expectations and psychological issues. It is important to point out that it cannot underestimate the habits of hygiene and general health scores, seeking to rule out potential threats to the emergence of peri-implant infections, such as smoking^{16,22}. The determination for each operative step or planning involved with regard to treatment time, will always consider the profile tapped of the patient when the consistent evaluation of each individual is with regard to the current condition, as well as in the appropriate parameters of recovery of the functionally stomatognathic apparatus [10, 12, 22].

In this work, the chosen approach of early loading was applied due to the advantages inherent to the main need of the patient to reduce the treatment time, recovery of masticatory function. Furthermore, to provide a preservation of the bone remnant due to the activation of compressive function on the adjacent alveolar ridge, both in the implanted area and in the plated by the transient prosthesis saddle (overdenture implanto muco supported). According to Francischone et col [9], prosthetic pieces attached on implants by screws on bars, are advantageous in the requirements, easier of removal of the parts for maintenance purposes. The substitution of screws and hygiene accesses also prevent bacterial development action in the gingival grooves, which promotes the formation of biofilm and consequently, inflammatory diseases with the potential to compromise peri implant health. Another point of interesting advantage is the possibility of rehabilitating reduced intermaxillary spaces, since the platform gains more proximity to the occlusal table, besides considering the preservation of thicker soft tissues as remnants [23]. Although, the same advantages become disadvantages such as the ease of access to the fixing screws allowing a higher incidence of visiting for torque adjustments in the screws, or the exposure of the fasteners to higher occlusal loads. The reason for this kind of event is, since often the surface of the occlusal platform can be occupied by 50% or more by the fixing screw itself [14]. Those cases, raise the issue of aesthetic commitment due to the presence of this access, and also because its tunnels, which are obstructed with resin, offer the ideal habitat for bacterial proliferation, generating not only inflammation, but also a recurrent complaint of patients: an unpleasant and persistent odor to even when using a big variety in products and hygiene techniques. The most important issue to be raised for the

hypothesis of loosening of fixing screws¹. For Hebel and Gajjar¹⁰, it would be the justification that such events would be repeated due to maladaptations in the implant region that would reflect their loads to the screwing area. There's an opinion which corroborates with Kucey and Fraser¹³, that being considered extensive areas in the occlusal platform, becomes active in the absorption of masticatory loads, forming a cycle of wear of resins in the tunnels and loosening of screws. Considering a long term, would establish a risk for the mechanical maintenance of the system.

Although all those several challenging factors, according to Dantas and Ramalho ⁶, it has been the choice of most Brazilian dentists for rehabilitation.

CONCLUSION

Among all the factors analyzed in the treatment planning and procedures followed, with complications and adjustments in the constructive process of the prosthetic parts, we can affirm that the process was developed and completed within the gathering all aspects of the initial clinical examination. Respecting all biological bases, and the use of technology inserted from each of the selected materials and techniques presented here, it is possible to reaffirm the predictability and safe dynamics of satisfactory results from a professional point of view. The positive response to the results in the patient's opinion reiterates the choice of implants, as a tool of extreme importance for clinical practice, and also how safety for the patient in results, provided that with indication carefully evaluated.

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Nil.

Conflict of Interest

The authors declare no conflict of interest.

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