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# Rehabilitation of Atrophic Jaws: A Clinical Challenge

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## Abstract

The rehabilitation of atrophic jaws remains a significant challenge for contemporary clinicians. Due to anatomical and physiological constraints, bone resorption limits the placement of implants by conventional methods. Successful management requires the integration of various surgical and prosthetic techniques, unified from the diagnostic and planning phases through to treatment, under a reverse protocol that ensures predictable, long-term esthetic and functional outcomes. An important limitation (aesthetic-functional) that can be found approaching these cases is time, a period in which the patients are expected to go through changes or different stages of bone healing, implant osseointegration, among others, which does not allow the use of any provisional rehabilitation system to avoid excessive forces or loads that endanger the success of the treatment.

## Keywords

Atrophic jaws; Implant osseointegration; Bone healing; Rehabilitation.

## Introduction

One of the principal limitations in the management of these cases is the healing period associated with osseointegration. During this time, patients are unable to wear provisional devices to avoid excessive functional loading, which may compromise treatment success. To overcome this limitation, clinical strategies must incorporate advanced technologies and workflows that facilitate the application of the Reverse Protocol, understandable not only to patients but also to colleagues and laboratory staff. Furthermore, minimally invasive surgical techniques should be employed, allowing multiple procedures to be performed in a single intervention. This reduces surgical trauma, pharmacological requirements, rehabilitation times, patient discomfort, and overall treatment costs. Ultimately, the integration of modern implantology concepts from both surgical and prosthetic perspectives—summarized as the **Integrity Concept**—aims to achieve durable esthetic and functional improvements.

When the literature review was done, it was found that due to the physiological bone phenomena by which the vertical and horizontal bone atrophies of the maxillo-mandibular complex occur, it is difficult to place dental implants in ideal areas [1], having to do the indicated clinical and imaging study (CBCT) of the existing bone condition to properly select the reconstructive surgical technique prior to implant placement [2].

In order to provide an effective therapeutic option to our patients, numerous innovations in the world of oral implantology have been described in the literature for many years, including not only variations in the macrodesign of the implant [3] and prosthetic components, but the combination of surgical techniques in their placement, being standardized and combined with immediate loading protocols [4,5] that guarantee the reduction of treatment times (osseointegration period described by Adell et al.) [6] and show the evolution in this field with the incorporation of immediate loading.

The combination of various implant techniques provided by the versatility of the available implant systems (narrow, short, extra-short, zygomatic and pterygoid) [7] used for the resolution of maxillo- mandibular bone atrophies in our daily practice, means a great advantage at the time of decision making of the case, adding the importance of selecting the proper surgical technique [8] (post- extraction, sinus floor elevation, osseodensification, vertical-horizontal bone regeneration and guided surgery) whose main objective is to achieve the insertion of implants with the least number of surgeries possible reducing treatment time with an aesthetic-functional result.

## Case Report 1

A 65-year-old female patient, with a 20-year history of smoking and no systemic comorbidities, presented to our clinic with the desire to improve her esthetic and functional condition. Clinical evaluation revealed poor oral hygiene, chronic periodontitis, and generalized mobility of all maxillary teeth (Miller Class II–III). Radiographic assessment identified an extensive bone defect secondary to an exacerbated chronic periapical cyst located in the right maxillary alveolar process with extension into the maxillary body.

### Treatment Planning and Procedure:

The treatment plan involved the application of the Reverse Protocol, fabrication of a surgical guide, and a provisional prosthesis (Gallucci type). Under local anesthesia and intravenous sedation, serial extractions of

the maxillary dentition were performed, followed by enucleation of the periapical cyst, bone curettage, and immediate reconstruction. Bone regeneration was achieved using a 50:50 mixture of autogenous graft harvested from the retromolar trigone (ACM Bonecollector – Neobiotech) and xenograft, combined with APRF membranes according to Choukroun's protocol.


**Figure 1:** Before - After

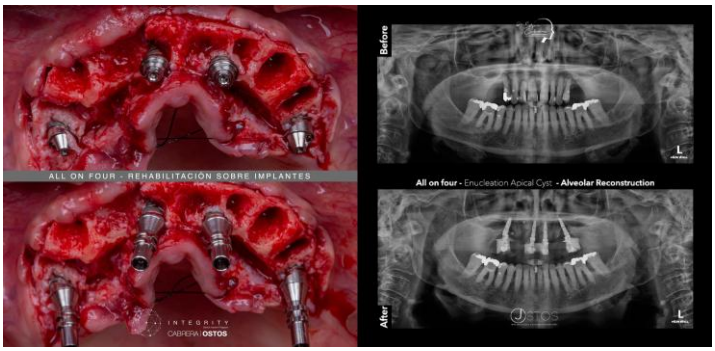


**Figure 2:** OPG Series Before - After / Surgical Phase.

**Figure 3:** OPG Control 36 month.

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Four Neobiotech ISIII implants were immediately placed with palatal anchorage: two anterior implants directed toward the anterior nasal spine and two posterior implants placed with angulation. Immediate loading was performed by placing straight multi-unit abutments on the anterior implants and 17° angled abutments posteriorly. The provisional prosthesis was adapted using provisional cylinders and relined with UFI Gel Hard C- VOCO. After two months, the definitive PF3 metal-ceramic dentogingival prosthesis was fabricated.

## Case Report 2

43-year-old male patient with no significant medical history, social alcohol drinke. Chief complaint: to have a significant change in his dental condition because since he was young, he went through non conservative and aggressive treatments in his country that led him to lose several teeth. Diagnosis of Periodontitis, bimaxillary partial edentulism, root fractures, multiple periapical lesions. The case planning will be done in two stages starting with the maxilla with a combination of multiple surgical procedures, dental implant placement and their immediate loading. Surgical procedures under local anesthesia: Surgical Extractions, Bilateral SCA Sinus Lift, ALL ON SIX protocol (4) where the immediate loading of provisionals was done only in 4 implants, GBR GTR, Soft Tissue Management. A monolithic Zr prosthesis was made, stained with MIYO and cemented to interfaces in the upper jaw and a metal-ceramic dentogingival prosthesis in the lower jaw. Both prostheses are screw-retained to allow prosthetic reversibility. The patient is currently undergoing controls and continuous follow-up every 3 months during the first year and then every 6 months, not showing any clinical or radiographic changes.


**Figure 4: Before – After.**

**Figure 5:** OPG series: a Post operative immediate implant placement. b) Post operative immediate loading in the mandible. c) Control series 4 years.

## Discussion

The choice of implant system and surgical-prosthetic solutions provided by Neobiotech® proved advantageous in clinical decision-making. By carefully selecting surgical techniques—post-extraction, cyst enucleation, and bone regeneration—it was possible to achieve implant placement with a reduced number of surgical interventions. This approach shortened overall treatment time and provided immediate esthetic and functional results. In literature revision it was found similar guidelines regarding the All on four protocol that was used as the primary loading protocol in almost all of the cases reports, highlighting why is it so used in most of the rehabilitations. Some of the main conditions of its frequent use are: Inadequate availability of residual alveolar bone. (posterior areas), Nerve proximity, Systemic Condition, Treatment time, Avoid bone reconstruction, Aesthetic and biological conditions where complex procedures are avoided like: GBR (VERTICAL -HORIZONTAL), Nerve transposition and grafting that prevent the patient to use their removable prosthesis or the use of loading protocols over the area for 6 to 8 months. The augmentation (GBR) procedure has the potential to increase patient ´s morbidity and complications. The concept of "All on four" was given by Paulo Malo and his co-workers in the year 2003. In this technique two implants placed vertically in the anterior region and two most posterior placed implants are placed in angled position bypassing anatomical structures i.e. mental nerve, maxillary sinus [8,9].

The all-on-four treatment concept arises as an attempt to allow treatment with affordable time and cost through immediate implant-supported restorations, providing relatively straightforward and predictable treatment in edentulous patients with atrophic jaws. The outcome is favorable in terms of quality of life [10], when compared with the traditional 3-6 months during which the fixtures are protected from premature loading, requiring second surgery to expose them and connect the trans- mucosal components, and increasing the time and cost of treatment, as well as patient morbidity. Another important point that has to be considered is that some authors report the use of guided surgery to obtain optimal insertion with adequate angle inclination – this being an affordable choice for full-arch fixed restorations with immediate loading. However, associated complications such as agresivo osseous regularizations, cyst and tumor presence that require more aggressive approaches, implant loss, prosthetic or surgical guide fractures, and low primary stability are often observed, and it is considered that we are currently in the learning curve and improvement to apply the technique in all of the cases as a protocol [11,12].

## Conclusion

The immediate loading procedure was born from the need to be able to offer patients a comprehensive treatment that would allow the patient to continue practicing their daily habits normally and unfolding in a normal life environment as quickly as possible within what is allowed, while being returned Health. Especially in patients with high aesthetic compromise, cases in which the patient could not or refused to be a carrier of removable prostheses, at the same time that he was given a fixed treatment and maintained over time.

The Reverse Protocol, combined with minimally invasive surgical techniques and modern implantology concepts, offers a predictable strategy for the rehabilitation of atrophic jaws. This approach reduces treatment time, surgical trauma, and patient discomfort, while simultaneously ensuring immediate and durable esthetic-functional outcomes.

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