

Rehabilitation with total fixed prosthesis on unfavorably positioned implants in maxilla:

Case report

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Abstract

The contemporary Implantology associated with dental prosthesis, provides various and very well substantiated alternatives for resolution of the most varied and critical situations in the dental clinic. These conditions naturally tend to be grouped into classifications extensively investigated and already enshrined in the international literature, considering, inclusively the importance of results continuously revealed by scientific evidence in this wide context. Within very well defined limits, it is feasible the indication and possibility of reutilization of unfavorable installed implants, as the starting point for another prosthetic planning. A new surgery to remove them and later install implants into supposedly ideal positions considering the resources available today, it may even be more logical or recommended, but not always technically possible, without having more complex procedures being required, adding greater discomfort, morbidity, taking longer for finalization. Considering all possible aspects which may involve the patient and the presented problem, together with the consistency of a more conservative approach in the planning of any treatment, causes the boldness and impetuosity inherent to knowledge of the innovative or cutting-edge, even if consecrated techniques, merge providentially with prudence and calibrated restraint in the field of interpretive treatments, resulting in significant benefits for patients. This article reports a case that illustrates this combination of analytical expectations. It brings together science, consciousness and experience. It merges theory and practice, combined with the expectation of good sense and good prognosis.

Keywords: Unfavorable implants position. Implant supported prostheses. Unfavorable inclined implants.

How to cite this article: Leahy FM. Rehabilitation with total fixed prosthesis on unfavorably positioned implants in maxilla: Case report. *Dental Press Implantol.* 2012 Jan-Mar;6(1):44-52.

» The author reports no commercial, proprietary or financial interest in the products or companies described in this article.

Submitted: 01/06/2012
Revised and accepted: 01/10/2012

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Introduction

It is natural that researches and studies worry in establishing protocols or routines in an needed attempt to systematize surgical and/or prosthetic procedures seeking always to point toward proven predictable and less traumatic results. Making use of one of the dogmas from Professor Brånemark who states that “less is more”, it is realized that there is a growing need to simplify the implant treatment in order to restore full arches and a concomitant desire to eliminate the grafts as an alternative therapy to provide quality rehabilitations in terms of esthetics, function and comfort for the patient.

Multiple aspects need to be interpreted in each clinical assessment, so that planning is optimized. Although a rich arsenal of technical conducts serving as a solid orientation is available, it is necessary to understand mainly the atypias of each case, considering the real possibilities and wishes of patients at the same time.

Therefore, it is desirable and expected that planning be previously defined in the daily care for these patients, so they may be applied within the needs and requirements that each case requires. This is a direct result from the assimilation of learning provided by studies and professional practice over a given period.

Also it is of great importance to highlight that, in addition to the ability to assess, diagnose, identify or define therapeutic conducts, it is essential to sharpen the sensitivity to observe apparently inconspicuous details. Listening very carefully to complaints and expectations of each patient — even if their desires are understandably inviable or controversial — and, finally, combining concepts and strategies that result always in the most direct, simple and objective way for both parties involved. In doing so, chances are good for obtaining desired, predictable and satisfactory results.

Even with several known diagnostic methods, additional examination and surgical techniques for the reconstruction of atrophic mandibles or mandibles, it is expected that when we are faced with classic cases of total edentulous patients with dentures, even before thinking directly in the preparation of a new removable full prosthesis, we are automatically induced to a planning of first choice involving the use of osseointegrated, short or zygomatic implants — proven effective, with their numerous designs and surfaces available in the market — or even conventional implants installed into an inclined position. Given the impossibility of applying these concepts, it is almost mandatory that comes in a logical sequence of planning the use of autogenous, homologous or xenogenous bone grafts, the regular installation of osseointegrated implants and subsequent rehabilitation with fixed prosthesis.¹⁻⁵

As well as a maxillomandibular ratio consists of natural teeth in occlusal balance, the partial or total-prosthetic rehabilitations, either conventional or on implant also need systematic occlusal adjustments, in alternate periods, which maintain or re-establish the balance of forces dissipated and assimilated throughout the stomatognathic system. In particular, the fixed prostheses supported by osseointegrated implants due to the lack of periodontal ligament in bone-implant interface - anatomical mechanism that individually provides characteristic and proper mobility to natural teeth in order to cushion, absorb and dissipate impacts during the movements of shearing and clenching of the mandible, among other masticatory loads -, effectively need resources that can play this function. The macro-design of implant, the structuring and prosthetic planning, the osseointegrated implant surrounding bone, the standard care for maintenance with oral hygiene, specific attention on some postural defects directly involving the temporomandibular joints, and prevention of some deleterious

dietary habits are important factors that influence and contribute positively especially when associated to the ADO'S FACTOR (Adjusting of Dimension and Distribution of Occlusal Stress and Strain), an acronym created by the Swedish scientist and professor Dr. P.I. Brånnemark to explain the "Adjusting of Dimension for Occlusal Stress, and the Dissipation for Osseointegrated Interface and Underlying Bone Tissue" or simply "Tertiary Stability" as was later designated.⁷⁻¹¹

This maintenance care contributes to increase significantly the longevity of natural or artificial teeth, as well as optimizing the duration and permanence of implants already osseointegrated. It is not a static, punctual, restricted process for a set of momentary measures, adjustments or procedures only, directed to a single work of temporary or "definitive" prosthesis performed on implants. It is a dynamic process. A preventive set of measures and adjustments that should be part of the investigative approaches for all clinical care to be implemented if necessary. Even because it starts from logical principle of all restorations or renovations performed by us and considered as finalized or "definitive", will always be temporary in time or use; i.e., they have lifetime. They need the combination of knowledge and application of specific methods which protect these devices from the continuous action of use and time, including implants already osseointegrated.

Case report

A 64-year-old patient, female, leucoderma with fixed prosthesis of porcelain-fused-to-metal on four implants unfavorably positioned in the anterior maxilla and lower prosthesis of the same material on four parallel implants in the anterior segment of the mandible. She reported crescent dissatisfaction with the results inherent to esthetic, phonetic, masticatory function and hygiene, since the fabrication and installation of fixed prostheses (six years ago). According to the

patient after questions regarding the items mentioned before, the author of her prostheses has stated repeatedly that there is no more technical possibilities for improving the results then obtained which caused conflicts in interpersonal relationships and led her to search for new alternatives to resolve her case. Given this first and unsatisfactory experience with dental implant surgery related to fixed prosthesis, the clear verbalization of her physical, psychological and financial limitations was considered a determinant argumentation in developing the new planning.

In the report, she had a history marked by suffering and pain in surgical stage. Some additional disorders in social and family life justified by the excessive delay in transition, execution and definitive delivery of the rehabilitation treatment - two years after onset. Major personal effort in gathering economic resources was intended to pay the treatment in question and finally the explicit appeal to avoid the possibility of a new surgical intervention in the same area. She even admitted the possibility of returning to use (upper and lower) double complete prosthesis, provided there was commitment with a more enjoyable esthetics than that which she using (Fig. 1). Increasingly, current Implantology has considered the possibility of simpler, more direct, objective therapy, in order to resolve adequately clinical situations without the need to impose complex surgical alternatives, involving autogenous, homologous or xenogenous bone grafts that normally have higher morbidity, to the patient.

Tilted implants and short implants come in this direction, minimizing surgical trauma and providing solutions for the installation of extremely effective, functional and durable prostheses.

In this specific case of unfavorably positioned implants, were considered the patient's wish, the use of common

sense and a detailed analysis to redesign and find a satisfactory, conservative prosthetic solution for necessity and convenience (Fig. 2). The limited bone availability in height and thickness suggested a direct and simple approach, avoiding removing this compromised implants incorrectly installed, which would certainly cause physical and emotional disorders in a sexagenarian patient, in addition to important quantitative bone losses in response to remaining alveolar ridge deficiency and the consequent need for reconstructive techniques with block bone grafts, preferably autogenous grafts (note: there was no specific instrument for a traumatic extraction of osseointegrated implants at that time).

First, after the extraction of the existing fixed (upper and lower) prostheses, it was decided, mutually agreed with the patient, to prepare provisional fixed or "transition" prostheses with metallic infrastructures, which could allow an immediate improvement in esthetics and chewing. So it was done and after this, unlike the combined, the patient only returned after three years to continue the treatment suggested, with the left posterior segment of the upper prosthesis fractured (Fig. 3). After emergency care and the insistent request of the patient to perform a weld in order to recover the referred provisional prosthesis, a recurring period of absence was observed until a new



Figure 1 - **A)** Initial photo showing the prosthesis fixed in porcelain with the esthetics totally impaired by the unfavorable installation of the implants and inadequate access of the fixed screws (buccal surfaces). **B)** Right lateral view of the occlusion prostheses: Anatomical disproportion and disharmony of the teeth and edentulous posterior superior region were observed. **C)** Left lateral view: Complete exposure of fixative screw.



Figure 2 - Screws indicating the direction at different plans of attachment, demonstrating unfavorably positioned implants.

fracture on the same side a year later was crucial to the early stages previously planned. Surgical installation of two tilted implants of 3.75 x 13 mm — one in each maxillary tuber, both attached from mesial to distal surface and locked with 35N/cm — contributed greatly to increase the stability, resistance and dissipation of loads. Consequently, it provided higher safety and longevity of the whole prosthesis, besides optimizing the masticatory action through the highest number of present dental units (Fig. 4).

With the use of plastic UCLAs now screwed on each implant, a bar was carefully constructed in mouth with

Pattern Resin®, in intimate contact with the gum tissue located above the remaining alveolar ridge, connecting all the prosthetic components. The cylinders placed on the unfavorably placed implants in the anterior maxilla were amputated approximately 1 mm below the top of the head of screws fixing them. Then, two posterior UCLAs were also cut at the predetermined level by wax bite plane and vertical dimension, also previously defined, by sending then the whole set for casting (Fig. 5).

An index was prepared to measure the passivity of the bar on the implants. As a result, after assembly testing of the teeth and final adjustments, there was the completion and



Figure 3 - A) Provisional (transition) upper and lower prostheses after 3 years of use. **B)** Front view and **C)** left side view, showing fracture of metallic infrastructure in the posterior segment in cantilever.

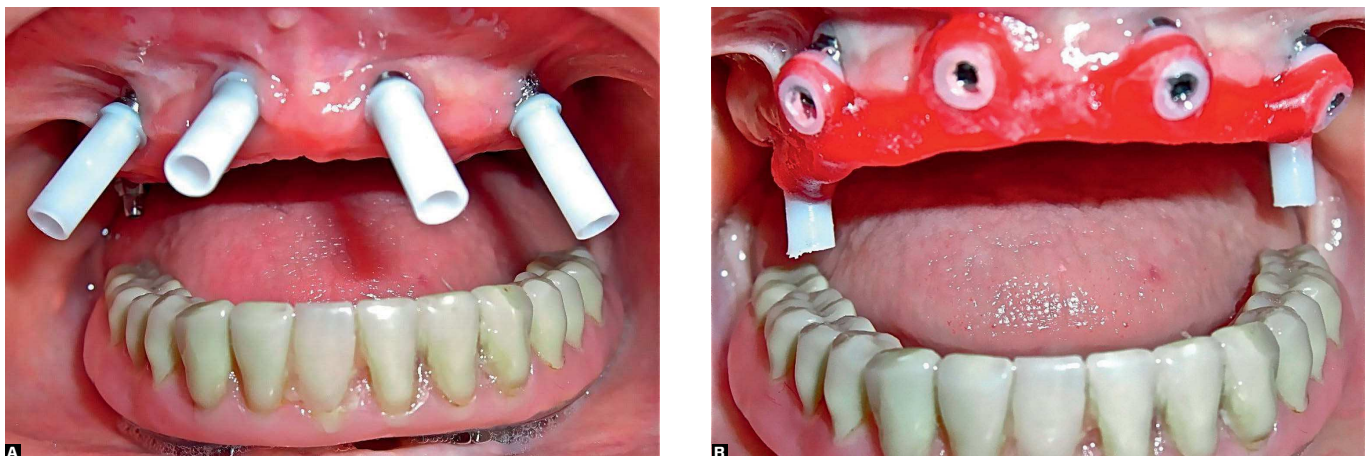


Figure 4 - A) Plastic UCLAs screwed on the preexisting anterior implants, for the beginning of the preparation of the resin bar. **B)** Resin bar (Pattern Resin®), connecting all the plastic UCLAs already cut. On the additional implants bilaterally installed in the maxillary tuber, the UCLAs amputations were performed according to the height of the registration.

installation of the upper prosthesis, with the respective gingival compensation for support of the lip and better esthetic results. With this new assembly and design conception, specifically the access holes of the screws fixing the prosthesis to the preexisting implants in the anterior maxilla began to emerge on the external surface of the gingival compensation. These access holes were sealed with pink acrylic resin, trying the mimicking as high as possible (Fig. 6). During the treatment, a new lower prosthesis was also prepared, seeking more esthetic and functional harmony. Unfortunately, the final photographic record of the case was completed fifteen days after the installation of the lower prosthesis — period for better adaptation of

mastication, phonetics and neuromuscular adjustments -, in which the patient, in response to the satisfaction of the new smile, decided and assumed risks on her own to seek a cosmetic professional who applied injectable PMMA (polymethylmethacrylate) in the orbicularis region of lip and nasolabial groove, with the specific intention (according to information obtained from the patient herself) to attenuate wrinkles and “rejuvenate” the mouth. This procedure slightly modified the desired esthetic result, but apparently did not compromise the patient’s self-esteem (Fig. 7). At the end of treatment, two photographs, initial and final, were presented to the patient with the purpose of establishing differences (Fig. 8).



Figure 5 - Acrylic bar ready for the additional laboratory adjustments and casting.



Figure 6 - Clinical case completed. Access holes from the previous implants filled with pink acrylic resin.



Figure 7 - Photo of smile 15 days after completion of the prostheses. Note the modification of the upper lip (elevation in the midline region) due to the use of PMMA.



Figure 8 - A) Initial case. B) Completed case.



Discussion

Currently, looking for similar situations, we may find numerous articles in the literature reporting cases of tilted implants related to pre-angled prosthetic components for rehabilitation with cemented or screwed prostheses which were technically designed and installed in order to resolve some clinical problems, in which more complex surgical approaches have not been used. The following examples, characteristics of “ectopic” positions of implants, are part of a group of techniques widely studied throughout the world providing sufficient scientific coverage and therefore predictability:¹²⁻¹⁶ The different and known surgical “approaches” for the use of (zygomatic) extramaxillary implants — that culminate their emergency profiles, the vast and overwhelming majority, in non-suitable sites for a conventional and regular rehabilitation —; posterior implants within the concept “all on four”, directing purposively to distal surface in order to reduce the extension of the cantilever in prosthesis and optimize the number of present dental units.

Within this same line of reasoning, we cannot consider to be “unfavorably positioned” these implants that are installed following the guidance of doctrines widely discussed, researched and scientifically devoted.

“Unfavorably positioned” implants suggest misapplication of a particular technique, iatrodontogenesis, surgical inability. It may be assumed that the concise and immediate extraction of these implants is part of any initial obvious planning, in most cases. Then, how do we imagine the viable prosthesis preparation on these errors? Probably, countless and atypical cases, gathering malpositioning in the installation of dental implants concomitantly with courageous and non-protocolled preparation of prostheses fixed on these same osseointegrated wandering cylinders, should have occurred on a large scale in different parts of the world; however, they were certainly not published in the same proportion.

In the 80s and 90s — when the osseointegration phenomenon actually got the attention of the scientific world — dental professionals put into practice multicenterly concepts and techniques created by the Swedish scientist and researcher P.I. Brånemark, and possibly they also started some risky variations of these techniques. Rights and wrongs, success and failure, result of the natural evolution and application of science findings occur in remarkable progression. The speed and effusive exchange of experiences, resulting from different ways of meetings, conclaves or scientific publications, formed a large information network, leading us to be part of a continuous and increasing learning curve.

Atypical cases are not part of predetermined rules or protocols that allow us to reproduce them such as they were designed. They are part of challenges, exceptions, and, as such they should be studied, planned and treated. They are of immeasurable value, contribution and benefit for the science.

Errors are usually results of inopportune boldness from those who precipitate, of the lack of caution, of those who do not plan and take the risks. However, they can and should be discussed, used as examples, to be properly prevented or simply corrected with the use of sensitivity and professional judgment.

In the early years of using osseointegrated implants for partial or total rehabilitation, if there were not to many options of designs and shapes of the prosthetic components in the market today for the resolution of the cases of “unfavorably positioned” implants, emergency alternatives were needed to be created using all the possible technical resources providing satisfactory esthetic and functional solutions, with greater comfort to the patient. A conscious sum of these factors led to procedures reported herein. When necessary, they may be used as conduct parameters in

cases which are similar with characteristics described herein. This was the main scope of this case report.

Conclusion

The reuse of unfavorably positioned implants is possible and feasible for the preparation and installation of fixed prostheses which are functional and esthetically pleasant. It depends directly on the judgment and careful evaluation of some important factors that should always be taken into account when we face

such situations. Because they are cases representing exceptions to the rule, they should be seen with moderation and without precipitations.

Individual aspects related to human conditions and expectations of the patient, related to technical peculiarities (clinical, biological and anatomical), must necessarily interact with the knowledge, sensitivity and analytical capacity of the professional to decide on the most appropriate treatment to be applied.

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