

# Mandibular Rehabilitation: The Peculiarities of the Multifunctional Guide

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**Abstract:** *Obtaining the ideal position of the implant is a critical consideration in surgeries for rehabilitation, favoring the ideal design of the prosthesis and an adequate maintenance of oral hygiene. A multifunctional guide can function as a surgical template during implant placement and provides a framework for the definitive impression and occlusal registration. The aim of this case report is show the need for good prosthetically - driven implant planning using a multifunctional guide before performing surgeries for prosthetic rehabilitation, through a case of poorly positioned implants, which affected the quality of the prosthesis. The patient had poorly positioned implants with bone loss that affected the quality of overdenture prosthesis, which did not provide comfort and safety in chewing. After radiographic and tomographic examinations, it was then planned the removal of all implants and new implant installation, as well as the preparation of a new prosthesis. The protocol proposed by Brånemark was adopted, with the installation of five new implants in ideal positions with the use of the multifunctional guide as a reference, and a new prosthesis was manufactured, following the concepts of occlusion and stability. The new prosthesis was installed 48 hours after surgery and provided comfort and satisfaction to the patient, returning masticatory and aesthetic function. After 18 months according to the patient is satisfied. The use of the multifunctional guide proved to effective for the success of mandibular rehabilitation with implants.*

**Keywords:** Dental Implants. Denture, Complete, Immediate Dental Implant Loading

## 1. Introduction

Dental loss has a major impact on tooth function, as well as on social, psychological, and esthetic aspects. After tooth extraction, patients must be rehabilitated to reestablish occlusion, chewing, and esthetics, as well as to improve quality of life and recover self - esteem [1, 2].

Osseointegrated dental implants have shown satisfactory results in prosthetic rehabilitation, returning both esthetics and function to patients over the long term [3, 4]. Despite this, failures of such implants can occur and can be defined as either early or late [5, 6]. Early failures are usually related to surgical failure or problems associated with healing, while late failures are mainly related to peri - implant or mechanical problems [7, 8, 9, 10].

Immediately loaded fixed complete denture prosthesis, represents a scientifically and clinically validated treatment modality for the restoration of function and esthetics in the edentulous patient. [11]

During the last decade the use of implants has widely spread among practitioners with increasing demand from patients and heavy marketing by the companies. However, reports about alarming implant failures are emerging in the literature which are mainly related to implant malpositioning as a result of poor treatment planning. [12]

Obtaining the ideal implant position is a critical consideration in surgery, as it can facilitate the ideal design of the prosthesis and allow for proper maintenance of oral hygiene [13].

While surgical technique for implant placement with an immediately loaded implant remains unchanged compared to

an implant that undergoes delayed loading, the prosthetic treatment phase necessitates significant modifications to achieve rapid fabrication of the prosthesis. Most frequently, dental implants are surgically placed by a guide or a template to a prosthetically predetermined position to allow the use of premachined attachments. [14]

In totally edentulous patients, one of the rehabilitation options is protocol - type prosthesis: a fixed, full - arch implant prosthesis [15]. The protocol proposed by Brånemark for lower edentulous patients placed four to six implants between the mental foramina [16]. Currently, a maximum of five implants are used to ensure that a good anteroposterior distance is maintained. In such cases, there is greater distance between the implants to reduce biomechanical problems [17].

This type of prosthesis offers several advantages for the patient. For instance, it confers greater psychological comfort because it is fixed; furthermore, it requires less maintenance and repairs [17, 18, 19].

The aim of this case report is show the need for good prosthetically - driven implant planning using a multifunctional guide before performing surgeries for prosthetic rehabilitation, through a case of poorly positioned implants, which affected the quality of the prosthesis.

## 2. Case Report

A 63 - year - old woman who was a non - smoker and had leukoderma, sought care in a private clinic and reported dissatisfaction with a full - arch over denture prosthesis in the jaw carried out five years ago, which did not provide satisfactory chewing or comfort.

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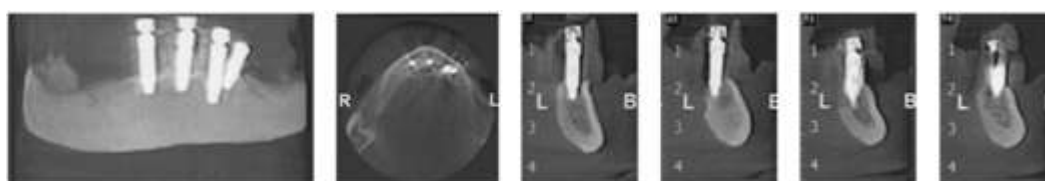
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**Figure 1:** Intraoral photos and photos of the prosthesis captured prior to treatment

In the anamnesis, the patient presented good general health, without important systemic pathology. Intraoral examination showed that the base of lower full - arch prosthesis over denture had invaded the sublingual space due to poor positioning of the osseointegrated implants. In addition, the

implants had several exposed threads. The initial tomographic examination confirmed the poor positioning of the old implants and the need of bone flattening before installing new implants.



**Figure 2:** Previous tomographic examination

The treatment plan proposed to the patient was to remove the unsatisfactory prosthesis and poorly positioned implants, plan a new, fixed, full - arch prosthesis, position new implants according to the multifunctional guide, and install the prosthesis with immediate loading.

Anesthesia was performed via lower alveolar bilateral nerve block using mepivacaine (2%) with epinephrine (1: 100, 000; New DFL®, Rio de Janeiro - RJ). A 15 - C blade (Swann - Morton, England) was used to make bilateral supracrestal incisions between premolars, and a total flap was detached to ensure good visualization of the area to be operated.



**Figure 3:** Multifunctional Guide manufactured

To remove the four poorly positioned implants, a 4.1 trephine drill (Systhex®, Curitiba - PR) was used to carry out cortical milling. Using a Retriever Key (Systhex®, Curitiba - PR) the implants were removed by applying counter torque using a torque wrench.

Following the protocol proposed by Brånemark (1981), we planned the installation of five external hex implants in the region of the chin between the mental foramina to support the new fixed full - arch prosthesis.

After removal of the implants, with the multifunctional guide was determined the position of the implants to be installed. Between the mental foramina, five external hex implants (3.75x13 mm; Systhex®, Curitiba - PR) were installed, all with a torque of 45 N/cm. Prior to suturing, conical mini abutments and the corresponding molding transferents were installed on the implants to allow for an open tray (Systhex®, Curitiba - PR).

The patient was medicated 1 hour before the surgical procedure using 10 mg diazepam (Roche Holding AG, Switzerland) and 4 mg betamethasone (Mantecorp - Hypera SA, São Paulo).

After installation of the components, the flap was sutured using interrupted sutures of 5.0 mononylon yarn (Ethicon®, USA).



**Figure 4:** Removal of implants, installation of new implants and suture

The molding transfers were joined together and the multifunction guide was fixed in the patient's usual maximum intercuspation position using pattern acrylic resin (GC America INC®, USA). With the guide attached, occlusion was registered at two posterior points using

pattern acrylic resin, as well as in a previous point (GC America INC®, USA). Transfer molding was then performed using condensation silicone Zetaplus and Oranwash (Zhermack SpA®, Italy).



**Figure 5:** Joining of the transfers, molding, and installation of the new prosthesis

For post - operative pain control, the patient was prescribed two daily 600 - mg doses of arginine ibuprofen (Zambon®, Italy). To prevent infection, the patient was prescribed 500 - mg doses of amoxicillin (GSK®, England) thrice daily for 7 days. The patient also received guidance on post - operative care and hygiene.

After 7 days, the patient presented good healing, with no signs or symptoms of inflammation. The sutures were then removed. Again, oral hygiene instructions and recommendations regarding the prosthesis were provided. It was recommended that the patient return every 6 months.

The new hybrid, fixed, full - arch prosthesis was installed 48 hours after the surgical procedure. The torque on the screws (Systhex®, Curitiba - PR) was 10 N/cm.

After 18 months, the patient reported that the prosthesis provided esthetics, good function, and comfort during eating and speaking. The implants showed no bone loss or mobility.



**Figure 6:** Prosthesis after 18 months in use



Figure 7: Panoramic post - treatment radiography

### 3. Discussion

Rehabilitation using osseointegrated implants is a good long-term option, with success rates of more than 80% after 16 years in use [6]. Many factors determine the success of implants: positioning, health and management of the soft and hard tissues, and prosthetic solutions; in this regard, well-positioned implants facilitate both esthetic and prosthetic procedures. They also favor the dissipation of forces and the stability of peri-implant tissues over the long term. In addition, they simplify the hygiene performed by the patient [20, 21]. Implant removal should be considered, but the need of bone grafting could make the decision more complicated [13].

In partially edentulous patients, it is simpler to replace elements immediately, because the procedure can be guided by the position of neighboring teeth. In patients with totally edentulous arches, or in those who have an indication for extraction of all teeth, planning must be more discerning so that the orientation of the implants coincides with the position of the prosthesis [22].

Prosthetically-driven implant planning consists of installing the implants in places previously determined by prosthetic and radiological planning. This provides a more predictable treatment to the patient and greater safety to the dentist, both of which are key points in the success of rehabilitative treatment [23, 24].

Therefore, implant dental surgeons must have extensive knowledge of both the surgical and prosthetic phases of implantation, ensuring correct planning, implant selection, prosthetic components, and occlusal restoration [25]. The present case report illustrates this need.

The incorrect positioning of the implant can result in aesthetic, biological complications and in extreme situations, making the desired prosthetic rehabilitation impossible [13]. In the reported case, the previously installed implants were in unfavorable positions, which made the prosthesis uncomfortable. With this in mind, and given that badly positioned implants that compromise the prosthesis should be removed, we planned to remove the previously installed implants and install new implants, using as reference the multifunctional guide.

Implant splinting might be a determining factor for achieving an accurate master cast, regardless of the impression material. The splinting techniques eliminates any

rotational or translational movements of the impression copings during the impression and analogue attachment procedures. However, resin shrinkage and manipulation remain a concern [26].

The implantodontist, based on his specialty and knowledge, should recommend to the patient what are the advantages and disadvantages of the recommended therapy and treatment alternatives, from costs, expectations, possible risks and complications [12]. Thus, we could provide the patient with a new, more esthetic prosthesis that offered more comfort, improving both function and quality of life. After the retreatment, the patient was satisfied with the work.

Dental professionals must marry the personal opinion of patients with scientific evidence, thus providing functional, esthetic, and comfortable treatment that allows the health of the oral tissues to be maintained [27, 28].

### 4. Conclusion

After 18 months, the patient presented peri-implant health and good function in the prosthesis, reporting satisfactory function. In conclusion, the multifunctional guide is important for the success of rehabilitation using implants, regardless of the type of prosthesis planned.

### 5. Conflicts of interest

The authors declare that there is no conflicts of interest regarding the publication of this article.

### References

- [1] S. Windael, S. Vervaeke, L. Wijnen, W. Jacquet, H. De Bruyn, and B. Collaert. "Ten-year follow-up of dental implants used for immediate loading in the edentulous mandible: a prospective clinical study," *Clinical Implant Dentistry and Related Research*, vol.20, no.4, pp.515–521, 2018.
- [2] S. S. Rocha, D. R. Souza, J. M. A. Fernandes, R. R. Garcia, and R. A. Zavanello. "Total fixed prosthesis bimaxillary protocol type. Case report," *Revista Odontológica do Brasil Central*, vol.21, no.60, pp.21–27, 2013.
- [3] E. Figueiro, F. Graziani, I. Sanz, D. Herrera, and M. Sanz. "Management of peri-implant mucositis and peri-implantitis," *Periodontology 2000*, vol.66, pp.255–273, 2014.
- [4] B. E. Ptejursson, A. G. Asgeirsson, M. Zwahlen, and I. Sailer. "Improvements in implant dentistry over the last decade: comparison of survival and complication rates in older and newer publications," *International Journal of Oral and Maxillofacial Implants*, vol.29, pp.308–324, 2014.
- [5] M. Al-Sabbagh and I. Bhavsar. "Key local and surgical factors related to implant failure," *Dent Clin North Am*, vol.59, no.1, pp.1–23, 2015.
- [6] P. Simonis, T. Dufour, and H. Tenenbaum. "Long-term implant survival and success: A 10–16-year follow-up of non-submerged dental implants,

- "Clinical Oral Implants Research, vol.21, pp.772–777, 2010.
- [7] M. A. Bianchini. "Diagnosis and treatment of peri - implant changes," São Paulo: Santos, 2014.
- [8] Y. Manor, S. Oubaid, O. Mardinger, G. Chaushu, and J. Nissan. "Characteristics of early versus late implant failure: A retrospective study," *Journal of Oral and Maxillofacial Surgery*, vol.67, no.12, pp.2649–2652, 2009.
- [9] S. Sakka, K. Baroudi, and M. Z. Nassani. "Factors associated with early and late failure of dental implants," *Journal of Investigative and Clinical Dentistry*, vol.3, no.4, pp.258–261, 2012.
- [10] B. R. Chrcanovic, T. Albrektsson, and A. Wennerberg. "Reasons for failures of oral implants," *Journal of Oral Rehabilitation*, vol.41, no.6, pp.443–476, 2014.
- [11] S. M. Meloni, M. Tallarico, M. Pisano, E. Khanari, L. Canullo. "Immediate loading of fixed complete denture prosthesis supported by 4 - 8 implants placed using guided surgery: A 5 - year prospective study on 66 patients with 356 implants." *Clinical Implant Dentistry and Related Research*, vol.35, no.5, pp.610 - 621, 2016.
- [12] N. U. Zitzmann, M. D. Margolin, A. Filippi, R. Weiger, G. Krastl. "Patient assessment and diagnosis in implant treatment," *Australian Dental Journal*, vol.53, no.1, S3–10, 2008.
- [13] M. Tallarico, R. Scrascia, M. Annucci, S. M. Meloni, A. I. Lumbau, A. Koshovari, A. Koshovari, E. Khanari, M. Martinolli. "Errors in Implant Positioning Due to Lack of Planning: A Clinical Case Report of New Prosthetic Materials and Solutions," *Materials. Multidisciplinary Digital Publishing Institute*, vol.13, no.8, pp.1883–1895, 2020.
- [14] A. Ozkomur, F. Manfroi. "Multifunctional guide for implant placement, impressions, and an occlusal index for fixed complete dentures." *Journal of Prosthodontics*, vol.27, no.2, pp.197 - 200, 2018.
- [15] J. Caramês, D. Marques, J. M. Barbosa, A. Moreira, P. Crispim, and A. Chen. "Full-arch implant-supported rehabilitations: A prospective study comparing porcelain-veneered zirconia frameworks to monolithic zirconia," *Clinical Oral Implants Research*, vol.30, pp.68–78, 2019.
- [16] P. I. Brånemark, B. O. Hansson, R. Adell, U. Breine, J. Lindström, O. Hallén, and A. Ohman. "Osseointegrated implants in the treatment of the edentulous jaw. Experience from a 10 - year period," *Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, Supplement*, vol.16, pp.1–132, 1977.
- [17] Misch C. "Contemporary dental implants," 3rd ed, Rio de Janeiro: Elsevier, 2008.
- [18] W. Li, J. Chow, E. Hui, P. K. Lee, and R. Chow. "Retrospective study on immediate functional loading of edentulous maxillas and mandibles with 690 implants, up to 71 months of follow - up," *Journal of Oral and Maxillofacial Surgery*, vol.67, no.12, pp.2653–2662, 2009.
- [19] P. Paspaspyridakos, T. B. Bordin, Z. S. Natto, Y. J. Kim, K. El - Rafie, A. Tsigarida, K. Chochlidakis, and H. P. Weber. "Double full - arch fixed implant - supported prostheses: Outcomes and complications after a mean follow - up of 5 years," *Journal of Prosthodontics*, vol.28, no.4, pp.387–397, 2019.
- [20] B. M. F. Pereira et al. "Prosthetic solution for poorly positioned implants: A clinical case report," *Journal of the Health Sciences Institute*, vol.29, no.4, pp.257–260, 2011.
- [21] J. D'haese, J. Ackhurst, D. Wismeijer, H. De Bruyn, and A. Tahmaseb. "Current state of the art of computer - guided implant surgery," *Periodontology 2000*, vol.73, no.1, pp.121–133, 2017.
- [22] A. F. Borges, M. R. M. Rego, A. M. Corrêa, M. F. Torres, D. M. Telles, and L. C. Santiago. "Planning and treatment in oral rehabilitation with implant - supported prostheses using cephalometric analysis," *Revista Gaúchade Odontologia*, vol.62, no.2, pp.179–184, 2014.
- [23] R. Curcio, G. L. Perin, I. Chilvarquer, M. L. Borri, and S. Ajzen. "Use of models in surgical predictability of oral rehabilitations," *Acta Cirúrgica Brasileira*, vol.22, no.5, 387–395, 2007.
- [24] R. A. Boyce and G. Klemons. "Treatment planning for restorative implantology," *Dental Clinics of North America*, vol.59, no.2, 291–304, 2015.
- [25] J. C. Zielak, M. K. D. M. Araújo, R. A. C. Ornaghi, A. F. Giovanini, E. A. Campos, and T. M. Deliberator. "Unfavorable positioning of upper anterior dental implants - Case report," *South Brazilian Dentistry Journal*, vol.6, no.2, pp.214–220, 2009.
- [26] A. Pozzi, M. Tallarico, F. Mangani, A. Barlatanni, "Different implant impression techniques for edentulous patients treated with CAD/CAM complete - arch prostheses: a randomized controlled trial reporting data at 3 year post - loading." *Eur J Oral Implantol*, vol.6, no.4, pp.325 - 340, 2013.
- [27] N. Sesma, M. S. S. Camargo, M. N. Pigozzo, P. F. Cesar, R. C. Stegun, and D. C. Laganá. "Pre - surgical prosthetic planning in implant dentistry: A clinical case with gingival smile correction," *Revista da Associação Paulista de Cirurgiões Dentistas*, vol.68, no.4, pp.296–301, 2014.
- [28] A. P. Amoroso, H. Gennari Filho, E. P. Pellizzer, M. C. Goiato, J. F. Santiago Jr., and L. M. R. Villa. "Reverse planning in implantology: Clinical case report," *Araçatuba Dental Magazine*, vol.33, no.2, pp.75–79, 2012.