GUIDED SURGERY – A CLINICAL CASE REPORT

JULIO CÉSAR **CAMPELO**[1], MICHEL ZINI MOREIRA DA **SILVA**[2*]

1. Undergraduate student of Dentistry, Faculty Ingá; **2.** Master and Specialist in Oral and Maxillofacial Surgery and Traumatology, Sagrado Coração University; Professor of the Graduation course in Dentistry, Faculty Ingá.

* Morangueira Avenue, 6104, Maringá, Paraná, Brazil. ZIP CODE: 87035-510 michelzini@gmail.com

Received: 07/03/2015. **Accepted:** 21/09/2015

ABSTRACT

Oral rehabilitation of the total edentulous patients through the implantology and prosthesis has evolved with the advancement of surgical techniques, prosthetic and imaginology. Technological advances and the concern to provide a treatment ensuring patient satisfaction directed studies for new implants installation techniques, among which stands out the guided surgery technique. This therapeutic modality professes prosthetic reverse planning to ensure a successful rehabilitation with implant-supported prosthesis. Prior planning the location of implants ensures aesthetics and appropriate prosthetic function, important factors and difficult to set only the imaging tests in two dimensions. Among the advantages observed, it is noteworthy greater predictability and ease in performing the surgical procedure and lower morbidity. This study aims to address the current aspects of guided surgery to implant dentistry, reporting a case of rehabilitation edentulous jaw using the Neoguide system.

KEYWORDS: Guided surgery, tomography computed, dental implants.

1. INTRODUCTION

The rehabilitation treatment in full or partially edentulous patients with dental implants has been widely used by recovering the aesthetics and function of the phonetic and stomatognathic system, providing a better quality of life for patients[1,2].

Successive technological advances have made it possible surgical/ prosthetic planning through computerized surgical guides, conducted by the materialization of anatomical structures by means of computed tomography which enables the visualization of the relationship of the implants with the anatomy of each patient[2,3]. Thus, providing greater security for the dentist during surgery less surgical morbidity[4,5,6 2,6,7,8,9] by the absence of retail and then, less invasive[10,11,12] and allows greater prosthetic predictability[13,14,15,16].

Using the technique requires the virtual planning of surgery in computer, through the 3D image manipulation of the jaws of the patient, carried out with the support of a high-resolution computed tomography[17,18]. In this phase of treatment, the dentist can determine with maximum precision, types, lengths, diameters and positions of the implants to be implanted[15,16].

The traditional protocol proposed by Branemark, for installation of dental implants is based on the making of a fixed prosthesis in six implants placed in the maxilla. After an initial healing period necessary for the occurrence of osseointegration, the implants are exposed and restored with a fixed prosthesis retained by screws[1,19]. At the time of surgery, a set of specific instruments Neoguide® system used to implant placement with total precision through the surgical guide[20].

In this article, a case of rehabilitation will be reported with implant-supported prosthesis through keyhole surgery, in fully edentulous maxilla, and addressing the evolution of implant dentistry and how technology, well used, benefits patients.

2. CASE REPORT

Patient, 42 years old, male, was admitted to the Dental Clinic of the Faculty Ingá, for Guided Surgery Jaw, in which the treatment plan was a Superior Protocol. This consists of installing six implants in the jaw region for making the prosthesis on the implants later after osseointegration.

In order to realize the reverse planning of surgery, a CT scan of the jaw used generated images for the Dental Slice® that allows virtual implant. After this step, the image is sent by email to a specialized company that will fabricate the surgical guide (Figure 1).

The guide attached to the mouth (Figure 2) of patients after local anesthesia. We should remember that we used much less anesthetic to perform this technique in view of the conventional technique.

As the surgical guide showing the position of the implant, the incision in the traditional manner is not therefore necessary to open all the gum is not necessary for milling (Figure 3) and installing the implants (Figure 4) but only to remove the region in which the implants will install.

Figure1. Surgical Guide for Guided Surgery.

Figure 2. Guide coupled to the patient's mouth.

Figure 3. Milling for installing implants.

This will provide a much more comfortable postoperative patient and virtually no bleeding occurs during surgery.

After installing all six implants, there is practically no surgical signals, how the patient will use the old denture until the end of osseointegration, the suture is not necessary, and the adaptation of this prosthesis is perfect because there is no tissue manipulation (Figure 5).

Figure 4. Implant installation.

Figure 5. Final appearance after implant placement and removal of the surgical guide

3. DISCUSSION

The oral implants are a reality present in the lives of patients and increasingly, these prizes for a comfort in chewing and performing cosmetic dentistry due to past trauma as removing teeth in series, accidents, etc. Together with this goal of quality of life desired by society, one should also take into consideration the condition of the surgical discomfort, in the case of keyhole surgery is considerably diminished[2,6,7,8,9].

We can state categorically that surgery guided by computed tomography makes during surgery least amount of anesthetic is used the patient after surgery is much more quiet, and the decrease in swelling and postoperative pain will be much lower[18].

Another positive factor for this type of procedure is that predictability of the case, called reverse engineering; it is a reality-guided surgery in cases where the whole treatment of the patient will be planned in three dimensions[18].

The great question of the guided surgery often is the accuracy of CT scanners and the distortion caused by the same may affect whether or not surgery[21,22]. Schneider *et al.* (2009) aimed in his study doing a literature review to gather information about the precision implants placed through a keyhole surgery technique. As a result the au-

thor found in his research an average deviation 1,07mm 1,63mm at the entrance and the average apex. The author also observed high success rate of implants, reporting that a value of 91 to 100% Maintenance of the implants installed in one observation time ranging between 12 and 60 months[23].

Much of the variation of the implants is questioned due to failure in setting the surgical guide and Novellino (2011)[24] in his thesis studied by the introduction of devices for retention and support in the guides tomographic technique guided surgery. Searching see if would interfere with the position and inclination of implants on their release. For this, the author concocted 10 models simulating bone were divided into two groups: 5 with CT guide and surgery with the traditional method using 5 change in the conventional technique. Novellino propose that there is a risk the tab tomographic move during the scanning process in the scanner. Therefore in their modification where he developed a ortho-implant docking system over three strategic locations in the patient attaches to the prosthetic device O' Ring type commonly used in retaining overdentures type prostheses, which were fixed in the search tab. The researcher evaluated the results by superimposing the virtual planning through pre-surgical CT scans with those carried out after implant placement. However, the results of analysis of variance for linear and angular deviations showed no statistically significant difference between the two groups.

Following the same principle Tahmeseb Ali (2009)[25] made a case report which clarified the operation of the protocol using the guides produced in the system (CAD/ CAM) for implant placement. Different from Novellino who worked with simulated models Tahmeseb demonstrated the technique in patients. With the previous installation of mini-implants to serve as anchor for the two guides. The procedure was performed on both very edentulous arches. Tahmeseb three weeks before the installation of the final implants made the installation of 6 mini-implants (3 in each jaw) trans-gingival by flapless technique. The mini-implants were distributed in a triangular arch (1 in the anterior region and each posterior region 1) with the function of stabilizing the tomographic initially and subsequently guide the surgical guide. Total 12 implants were installed (6 in each jaw) and the patient monitored for a period of 1 year. According to the author, the patient had no complaint about pain or discomfort after surgery. A final denture was installed immediately after surgery. The patient also presented very pleased with the aesthetic result of the work. Unfortunately, work did not count on a tomographic follow-up examination to compare the positions of implants planned for the same installed. What makes difficult the reliability of success? A panoramic x-ray was performed after surgery and already through it was possible to see some divergence in the position of some implants, but had no clinical significant result.

Currently, the technique increased the number of fixations that the guide did not move during surgery as needles and a graft screw assist on the palate. Even with this extra fixation surgery proved far more atraumatic. The bleeding during surgery is virtually nonexistent, and in most cases any kind of suture need be made. Another positive factor is that the denture the patient was accustomed, still perfectly fitting with no need for reembase or use of fasteners as Corega® or Fixodent®.

4. CONCLUSION

The guided surgery, is an evolution in dentistry, forcing professionals to carry out reverse engineering, thereby making less mistakes are made in treatments.

Even if there are small distortions in the images, in general do not affect the operations, allowing them to be carried out accurately and safely.

Less anesthetics are used for surgery is much less invasive, because there is no large incisions. The technique is faster than conventional to be held and edema and postoperative pain is much smaller or absent compared to standard technique.

REFERENCES

[1]. Kallas RBE, Maia BGF, Neiva TGG, Blatt M, Ventura JH**.** Cirurgia livre de retalho com função imediata associada ao planejamento computadorizado: relato de caso clínico. Rev Dental Press Periodontia Implantol., Maringá. 2008; 2(2):100-9.

[2]. Neto AV, Neves PJC, Madruga FATTA, Rocha RS, Carvalho RWF. Cirurgia guiada virtual para reabilitação oral: revisão de literatura e relato de caso. Rev. Cir. Traumatol. Buco-Maxilo-Fac. Camaragibe. 2009; 9(2):45- 52.

[3]. Queiroz TP, Esteves JC, Santos PL, Santos TL, Junior Betoni W. A cirurgia guiada como auxílio na Implantodontia. Full Dent. Sci. 2011; 2(8):376-80.

[4]. Meurer E, Oliveira MG, Meurer MI, Silva JVL, Bárbara AS, Heitz C. Os biomodelos de prototipagem rápida em cirurgia e traumatologia bucomaxilofacial. Rev ATO. 2007; 3(5):349-73.

[5]. Soares MM. Avaliação in vitro da precisão de um sistema de cirurgia guiada para a instalação de implantes. Dissertação (Mestrado) – Universidade do Grande Rio, Duque de Caxias. 2009.

[6]. Resener F. Cirurgia guiada por computador: um estudo de revisão bibliográfica no período de 2002 à 2009. [Monografia] Curitiba: Universidade Tuiti do Paraná. 2009.

[7]. Kessner Jr JB, Ferrari DS, Kawakami PY, Tavares U, Ferrari RB. Proposta de confecção da prótese protocolo, nas cargas imediatas de implantes instalados por cirurgia guiada. Implant News. 2011; 8(4).

[8]. Komiyama A, Klinge B, Hultin M. Treatment outcome of immediately loaded implants installed in edentulous jaws

following computer-assisted virtual treatment planning and flapless surgery. Clin Oral Implant Res. 2008; 19: 677-85.

[9]. Tenório JR, Souza ES, Gerbi MEM, Vasconcelos BCE. Prototipagem e cirurgia guiada em implantodontia: revisão de literatura RFO, Passo Fundo. 2015; 20(1):110-14.

[10]. Van Steenberghe D, Glauser R, Blombäck U, Andersson M, Schutyser F, Pettersson A, Wendelhag I. A computed tomographic scan-derived customized surgical template and fixed prosthesis for flapless surgery and immediate loading of implants in fully edentulous maxillae. A prospective multicenter study. Clin Implant Dent Relat Res. 2005; 7(suppl 1):S111-S120.

[11]. Van Steenberghe D, Naert I, Andersson M, Brajnovic I, Van Cleynenbreugel J, Suetens P. A custom template and defi native prosthesis allowing immediate implant in the maxilla: a clinical report. Int J of Oral Maxillofac Implants. 2002; 17:663-7.

[12]. Ersoy AE, Turkyilmaz I, Ozan O, McGlumphy EA. Reliability of Implant placement with stereolithographic surgical guides generated from computed tomography: clinical data from 94 implants. Journal of Periodontology. 2008; 79: 1339-45.

[13]. Molina IC, Molina GC, Bez L, Maginin RS, Volpato CAM. Cirugía guiada en implantología. Rev Odontol Mexi. 2013; 17(2):117-22.

[14]. Carvalho R, Francischone Jr C, Kobayashi F, Scarafissi P, Costa A, Francischone CE. Novo implante P-I Brånemark PhilosophyTM e cirurgia guiada por computador: inovações tecnológicas inaugurando uma nova era na Implantologia. Rev Dental Press Periodontia Implantol. 2007; 1(3):74-86.

[15]. Koutrach M, Nimmo A. Preservation of existing soft-tissue contours in the transition from a tooth to an implant restoration in the esthetic zone using a flapless approach: a clinical report. J Prosthodont. 2010; 19(5):391-6.

[16]. Malo P, de Araujo Nobre M, Lopes A. The use of computer-guided flapless implant surgery and four implants placed in immediate function to support a fixed denture: preliminary results after a mean follow-up period of thirteen months. J Prosthet Dent. 2007; 97(6 Suppl):S26-34.

[17]. Hoffmann GO. Avaliação da Precisão de Implantes Planejados com uso de Guia Cirúrgico Prototipado: Revisão de Literatura. Santa Catarina: Universidade Federal de Santa Catarina-Departamento de Odontologia. 2013.

[18]. Ferreira HC. Cirurgia sem retalho guiada por computador: aspectos relevantes. [Monografia] Anápolis: Instituto de ciências da saúde FUNORTE/ SOEBRÁS. 2014.

[19]. Oliveira DF. Prótese total inferior implanto suportada com carga imediata. [Monografia] Ipatinga: Instituto de ciências da saúde FUNORTE /SOEBRÁS. 2008.

[20]. De la Torre DLT. Cirurgia guiada virtual em maxila. Relato de um caso clínico. [Monografia] Curitiba: Instituto Latino Americano de Pesquisa e Ensino Odontológico. 2012.

[21]. Widmann G, Bale JR. Accuracy in computer-aided implant surgery Vareview. Int J Oral Maxillofac Implants. 2006; 21:305-13.

[22]. Yong TL, Moy PK. Complications of Computer-Aided-Desing/ Computer- Aided- Machining- Guided (NobelGuide™) Surgical Implant Placement: An Evaluation of early clinical results. Clin Implant Dent Relat Res. 2008; 10:123-7.

[23]. Schneider D, et al. A systematic review on the accuracy and the clinical outcome of computerguided template-based implant dentistry. Clin. Oral Impl. Res. Zurich. 2009; 73-86.

[24]. Novellino MM. Desvios lineares e angulares de implantes com guias prototipadas fixadas em modelos experimentais. Dissertação (Mestrado) São Paulo: Universidade de São Paulo. 2011.

[25]. Tahmaseb A, Clerck N, Wismeijer D. Computer-guided implant placement: 3D planning software, fixed intraoral reference points, and CAD/CAM technology. A !57 case report. The International Jornal Of Oral & MaxilofacialImplants, Amsterdam. 2009; 541-8.