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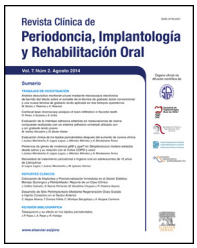

CLINICAL REPORT

Accuracy of computer-guided surgery

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Computer-guided surgery;
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Abstract Dental implant fixation techniques are widely studied in order to reduce surgical morbidity. Computer-guided flapless surgery has been considered an efficient alternative that presents several advantages and some limitations. This technique allows the virtual planning and simulation of the prosthetic-surgical treatment that can help predict the difficulties and limitations in order to reduce possible errors. In addition to the prosthetic predictability, computer-guided surgery enhances accuracy and reduces surgical morbidity. Thus, the aim of this study was to report on a 7-year follow-up of immediately loaded implants inserted into an edentulous maxilla using virtual planning and flapless surgery.

PALABRAS CLAVE
Cirugía guiada por ordenador;
Implantes dentales;
Cirugía flapless;
Carga inmediata;
Rehabilitación

La precisión de la cirugía guiada por ordenador

Resumen Las técnicas de fijación del implante dental se estudian ampliamente para reducir la morbilidad quirúrgica. La cirugía sin flapless guiada por ordenador ha sido considerada como una alternativa eficiente con varias ventajas y algunas limitaciones. Esta técnica permite la planificación virtual y simulación del tratamiento protésico quirúrgico con la predicción de las dificultades y limitaciones para reducir posibles errores. Además de la previsibilidad de prótesis,

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la cirugía guiada por ordenador mejora la precisión y reduce la morbilidad quirúrgica. Por lo tanto, el objetivo de este estudio fue reportar a 5 años de seguimiento de los implantes de carga inmediata insertados en un maxilar desdentado utilizando la planificación virtual y la cirugía sin colgajo. El presente caso prospectivo informó el éxito del tratamiento y destacó la importancia de la planificación, lo que justifica el costo de esta tecnología.

Introduction

The association of the computer-guided surgery and the flapless approach became an efficient alternative for implants insertion with several advantages, such as preservation of peri-implant bone volume; faster surgery; more patient's comfort; reduced bleeding, edema and post-operative pain, faster recovery and soft tissue, including gingival margins and papilla.[1]

The technique of the computer-guided surgery is indicated for the absence of dental units, partial or total, both in maxilla and mandible, provided that there is enough quantity of bone for the implant installation. Furthermore, another factor to be assessed is the patient's mouth opening, which must be greater than 50 mm between the residual alveolar ridge and the incisal of the teeth, to allow the placement of the surgical guide and appropriate positioning of the drill.[2]

However, the technique has some limitations, such as the poor visualization of anatomical structures and alveolar bone with a higher risk of perforation or fenestration in cortical and adjacent teeth, bone heating due to non-exposure of the tissue and poor bone refrigeration during osteotomy, and higher risk to implants malposition. In addition, it is also difficult to manipulate the soft tissue for a better adaptation of keratinized gingiva around the implant structures.[3]

Khorshid et al. (2014)[4] described, as consequences of the limitations mentioned above, complications such as: (1) lack of primary stability of dental implant and impossibility of applying immediate loading due to the low bone density; (2) diameter and size of inadequate implants, which may cause the microfracture of bone during implant placement and possible fibrous and granulation tissue encapsulation around the implants; (3) surgical positioning different from the virtual planning.

Considering all those limitations, the technique should be performed by experienced professionals who have a previous knowledge about the conventional technique in addition to the specific selection of cases with enough bone thickness in the alveolar ridge.

Thus, the aim of this study was to describe the accurate fixation of implants submitted to immediate loading in an edentulous maxilla using computer-guided virtual planning associated to flapless surgery after a 7-year follow-up.

Case report

The female Caucasian patient B.R.R., 38 years old, with good general health and edentulous maxilla for over 5 years, complained about esthetics and function of the maxillary complete denture. The patient presented natural teeth in mandible except for the right and left first molars (Fig. 1). After evaluation by experts in implantology, surgery and prosthodontics, the professionals indicated treatment using the Nobel Guide TM concept (Nobel Biocare AB) for virtual planning, flapless implant surgery and immediate loading of a maxillary screw-retained full-arch implant-supported denture.

Initially, the case was transferred to a semi-adjustable articulator after confirmation of a mouth opening greater than 50 mm and a low smile line. Functional wax try-in was conducted to determine better teeth positioning regarding esthetics, phonetics and occlusal vertical dimension. Duplication in colorless resin was carried out before computed tomography. A total of six perforations (1–1.5 mm in diameter; 0.5 mm in depth) were fabricated in the replica and 3 perforations were positioned at the buccal surface. The perforations were filled with gutta-percha (Tanari® – Tanariman Industrial Ltda, Amazonas, Manaus, Brazil) as radiopaque markers. Condensation silicone (Zetalabor® – Labordental, São Paulo, SP, Brazil) was used for inter-arch record in centric relation and occlusal vertical dimension. Computed tomography of the maxilla was conducted according to the ''double-scan'' technique, which shows several objects of different densities by two scans. The first scan was performed with the patient wearing the tomographic guide with radiopaque markers and inter-arch record. The second scan was made only for the tomographic guide. The tomographic slices presented 0.4 mm in thickness and data were recorded as DICOM files to be transferred to the virtual planning software (Nobel Guide – Nobel Biocare AB). The virtual planning

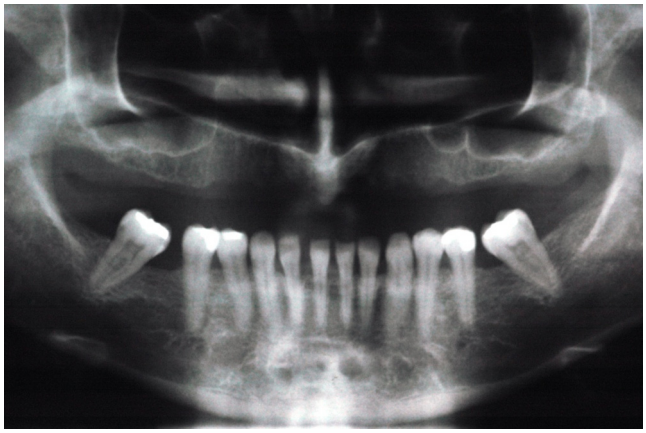

Figure 1 Pre operative panoramic radiograph.