Ceramic Implants: a New Alternative for Dental Rehabilitation

CASE REPORT

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Abstract

Titanium alloys are vastly used for fabrication of dental implants. New implant technologies are being developed due to immunological potential and possible aesthetic impairments with titanium implants. Since the end of the 1990's, zirconia was introduced in Dentistry due to its superior biomechanical properties compared to other ceramic oxides such as alumina, representing the material of choice for the fabrication of ceramic implants. Zirconia implants symbolize an ideal alternative for patients who seek for a metal free solution. The presence of abutment/implant in the one-piece conception provides excellent functional and aesthetic results, satisfying the most elevated levels of expectations. It presents superior biocompatibility compared to titanium and other metals, being effective as a new tendency to dental rehabilitation. The aim of this work was to briefly revise the literature and present a clinical case regarding the characteristics of zirconia implants in order to reinforce the attention of oral health professionals towards this promising alternative.

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Keywords

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Introduction

The replacement of missing teeth with implants in patients that are partially or totally edentulous have become a modality of dental treatment. It is based on osseointegration, which is the structural

and functional stability of implants on surrounding bony tissues.

Zirconia implants were capable to tolerate oral forces during a lengthy period of time, [2, 3] showing similar surface characteristics of osseointegration to titanium implants. Even though the prevalence of allergy to titanium is low (0.6%), it is attributed to this, in some cases, the failure of such implants. As a consequence, zirconia implants have been proposed as an alternative for such patients. [4, 5]

The ceramic materials offer a great advantage of not having metals in their structure when compared to dental implants already used. It provides a bio-compatible alternative to patients who cannot use traditional implants or are looking for non-metallic implants. [1-5]

This is one of the first studies utilizing zirconia implants, particularly, in Brazil. More studies are recommended to evaluate the benefits of ceramic implants.

Method

Initial Situation

White patient: 50 years old, male, attended to the private clinic reporting to have lost the tooth 14 many years ago due to dental fracture (**Figure 1: A**). After evaluation of the general health condition, and on the basis of clinical and radiographic findings (Cone beam computed tomography, **Figure 1: B**) that highlighted favourable bone availability

Figure 1: Clinical sequence of instalation of the Zirconia implant.

(A) Preoperative clinical aspect. (B) Preoperative computed tomography. (C) Clinical situation after elevation of the mucoperiosteal flap. (D) bone drilling. (E) Control of the implant position with a position indicator. (F) Final position of the implant. (G-H) Clinical transoperative aspect of the repositioning of soft tissues

Figure 2: Clinical sequence of the prosthetic restoration.

(A, B, C) Preparation of the provisional crown with exclusively aesthetic purpose.

to 3D positioning of the implant, the decision was taken in favour of a zirconia implant Straumann® PURE CERAMIC (10 mm, Ø 4.1 mm).

Surgical Procedure

An envelope flap was performed from a linear incision between the alveolar crestal bones at interdental level of the alveolar ridge (**Figure 1: C**). The drilling was performed according to the usual Straumann® BL protocol (**Figure 1: D**). After using the burs 2.8mm and 3.5mm, a position indicator was applied to determine the direction and adequate interocclusal space (**Figure 1: E**). Preceded by the placing of the zirconia implant (**Figure 1: F**), two simple monofilament sutures – Monocryl 5-0, were used for repositioning the soft tissues (**Figure 1: G and H**). It was possible to observe adequate alignment and positioning of the implant in the immediate postoperative period (**Figure 1: H**), favourable to prosthetic reconstruction.

Prosthetic Restoration

After the installation of the implant, a provisional crown was made for exclusively aesthetic purposes, in infra occlusion to avoid masticatory forces (**Figure 2: A and B**). The correct elaboration of the provisional crown in this case makes possible the maintenance of the marginal integrity of the periodontium and mainly the interdental papillae (**Figure 2: C**). After a period of three months, a ceramic crown will be made and the final impression will be taken.

Conclusions

It can be concluded from this study that:

- Zirconia implants have attracted a considerable interest from dentists, due to its favourable aesthetical results, mechanic resistance and tenacity, together with an elasticity modulus of the same magnitude as stainless steel. Denoting a new and promising tendency in implantology.
- The harmony between the zirconia implants and hard and soft tissues allow a very natural aesthetic solution.
- Zirconia implants are an excellent solution for patients with thin periodontal biotypes and localised gingival recession.
- Zirconia seems to be the adequate material for the fabrication of ceramic implants, because of its more aesthetic colour, mechanical properties, biocompatibility and low affinity for bacterial plaque.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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