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Oral rehabilitation using zirconia implants and zirconia prostheses – Case report

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Introduction

The zirconia used in **dental implants** has the following properties: greater fracture-resistance, greater flexural-resistance and greater torsion-resistance as compared to titanium[1].

Many studies with animals using zirconia were carried out with encouraging results in biological terms, and, also, comparative results with titanium implants showed that the "bone implant contact" (BIC) standards are similar between zirconia and titanium[2].

In terms of **prosthetic rehabilitation**, protocols using acrylic resin, which have low functional durability and doubtful esthetic stability, were gradually replaced by metal-ceramic protocols, and, following the popularity of metal-free reconstructions in dentistry, by all-zirconia protocols, with fore-teeth stratification, in the pursue of esthetic excellence[3].

Background / Aim

2001, the authors perform the placement of 211 **impacted zirconia monobloc implants** including this clinical case on 10 implants. A prosthetic fiber resin based restoration is preferred because the authors fear excessive hardness of a zirconia armature.

2003, the same authors establish during the Congress of the ABO the specificities of **an ideal zirconia implant**[4] namely:
screwed implant + two parts implant + possible angulation + presence of a shock absorber...

2012 ... birth of the Hexalobe Axis Biodental implant, today named CERALOG® Implant System…!

The goal is to know if this implant **meets the defined specifications** at long-term!

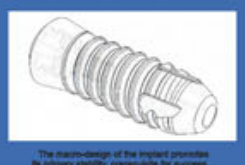



Materials

1. Implants

Zirconium oxide (ZrO_2), as a metal substitute, possesses **good physical properties**[1] and, furthermore, its **biocompatibility** as a dental implant material has been demonstrated in several animal investigations[2].
The excellent tissue reactions of the bone and the peri-implant mucosa confirm the good allernative for tooth replacement, especially in esthetically areas[1].

The placement of eight 10- or 12mm-long CERALOG Hexalobe implants was planned according to the location of the remaining bone without using bone grafts.


The macro-design of the implant promotes its primary stability, prerequisite for success...


The micro-design of the implant leads to the macroscopic destiny of each specific tissue


Surgical and prosthetic kit

2. Abutments

The main reason why CERALOG® implant system were chosen was that they had Pekkton® (**PEKK** - Poly Ether Ketone Ketone) prosthetic abutments.

This is a high-performance polymer that simulates the **peri-dental movement**. Its high adherence capacity makes it adequate as the interface between two zirconia surfaces (implant and denture), thus preventing excessive transversal and longitudinal forces both on the implants and the denture.


3. Prostheses

The Zirkonzahn® system has automated milling machines that produce a **pressed zirconia block**, the measures of which are compliant with the fabrication of a complete prosthesis.

This denture is subsequently synthesized and stratified, also at the gum portion, so that it may be adapted upon the implant abutments that are already integrated in the patient's mouth[5].



Methods

We strictly followed the manufacturer's data according to the surgical procedure.

Results



Patient before surgery


Pre-operative exams: orthopantomogram, CT scan



Implants insertion and healing screws (PEEK)


Zirkonzahn® modelisation

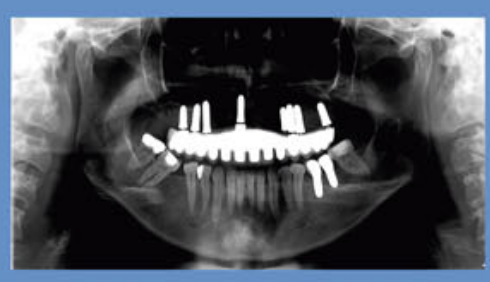
Final prostheses

Implementation of PEKK abutments

Endo-oral views

Smile of the patient... makeup on and hair styled !

Patient after 5 years



Orthopantomogram after 5 years

Conclusion

Full-mouth rehabilitation of a totally upper edentulous patient with no metal at all seemed a very faraway dream for present-day dentistry. However, **the combination of technologies in implantology and prostheses was possible** in this case, giving the patient not only her former function and esthetics but also the biocompatibility of zirconia both within the bone and outside the mouth, with excellent resistance, and incomparable prosthetic resolution.

In fact, according to the patient, she feels safe and confident in her social and family life. **The CERALOG® Implant System** counts with all the necessary elements so that any type of prostheses upon implants be developed, ranging from one-piece dentures to a total protocol, as shown in this case of total rehabilitation.

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