

Oral rehabilitation in the aesthetic area—One-year follow-up

Immediate ceramic implant with immediate provisionalisation and connective tissue graft

Alexandre Marques Paes da Silva¹, Francisco Augusto Horta⁴, Dennis de Carvalho Ferreira², Alice Maria de Oliveira Silva³, Mayla Kezy Silva Teixeira¹, Daniel de Moraes Telles¹, Eduardo José Veras Lourenço¹, Brasil

This case report aimed to describe the step-by-step oral rehabilitation using immediate implant with immediate provisionalisation using ceramic implants and connective tissue grafts and its clinical and radiographic performance after a 12-month follow-up period in the aesthetic area (lateral upper incisor).

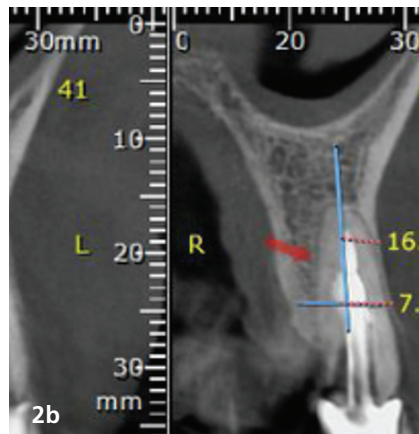
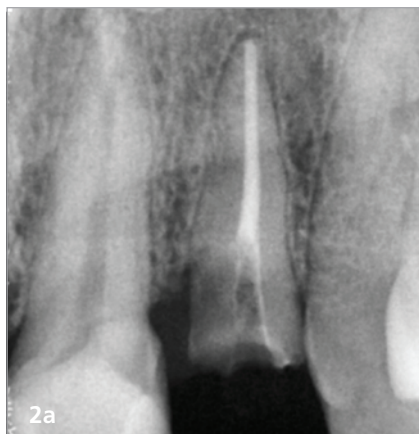
Abstract

Cone beam computed tomography (CBCT) was used for surgical planning and periapical radiographs were used in the immediate postoperative period and in implant follow-up consultations. Implants were installed in fresh sockets (immediate) with immediate provisionalisation. To fill the necessary gap, a bone substitute was used. Four months after surgery, the temporary crown was removed and a lithium disilicate crown was manufactured by impression with

addition silicone. The patient was followed for 12 months, and no prosthetic or biological complications were observed. During the entire follow-up period it was possible to observe stability of the marginal bone level and the peri-implant health of the implant. At the end of the treatment, when the definitive crown was cemented onto the abutment, the patient was asked about the degree of satisfaction with the aesthetic result of the treatment using a visual analogue scale and the patient reported being "very satisfied".



Fig. 1: Initial clinical situation.



Figs. 2a & b: Initial CBCT.

Introduction

Yttria-stabilised zirconia implants (YTZP) have emerged as a promising material with wide applicability in implant dentistry and are increasingly required not only by professionals, but also by many patients who wish to obtain metal-free oral rehabilitation.¹ Among the ceramic materials proposed for the manufacture of dental implants, such as alumina, which was the material used in the first ceramic implants launched on the market in the 1960s and 1970s, YTZP presents some advantages such as resistance to oxidation, high tenacity to fracture and flexural resistance, comparable to titanium implants (Ti).² It is worth noting that YTZP,

in addition to being a resistant material, with low affinity for oral biofilm (biocompatibility) when compared to TI, presents aesthetic advantages, especially when the professional is faced with challenging cases involving patients with a thin gingival phenotype.^{3,4} This fact occurs due to the white colour of the implant, similar to the colour of a natural tooth, helping to maintain the aesthetics of the rehabilitations and avoiding a grayish shadow on the gingival tissue, especially in patients with a thin gingival phenotype rehabilitated with TI. In current literature, studies show that the use of connective tissue graft (CTG) removed from the palate simultaneously with the placement of the dental implant helps in maintaining and, in some cases, increasing the volume of peri-implant soft tissues, helping in the final aesthetic result, especially in cases of metal implants and abutments.⁵ Regarding the low affinity for bacterial plaque, in some studies it was possible to observe a reduction in the formation of inflammatory cell infiltrate in the peri-implant soft tissue of implants made of zirconia.^{6,7}

Thus, the aim of this case report was to demonstrate the step-by-step oral rehabilitation with immediate loading using a ceramic implant with immediate provisionalisation and CTG and its clinical and radiographic performance after a 12-month follow-up period.

Case report

The patient attended a private clinical study center (SobreImplantes—Rio de Janeiro, Brazil) with the indication of installing dental implants. As it is an anterior region where maintaining aesthetics was a challenge, rehabilitation with a ceramic implant with immediate loading was proposed to the patient through a single implant-supported restoration and connective tissue graft, with the patient's own palate region as the donor area. To carry out the correct planning and diagnosis, the patient underwent cone beam computed tomography (CBCT), periapical radiography and intra-oral photographs (Figs. 1 & 2).

Although the patient had good control of supra- and subgingival bacterial

plaque, he underwent supragingival scaling and root planning prior to the surgical procedure. With the aim of maintaining the volume of the peri-implant tissue and avoiding any type of aesthetic collapse, the patient was informed of the importance and advantages of performing a CTG during the implant surgery procedure. This study was submitted to the ethics committee of the State University of Rio de Janeiro (UERJ-RJ) and approved under number 5,598,463. It should be noted that the participant was previously invited and informed about the study and signed an informed consent form to participate, with all ethical aspects respected.

Case description

The patient is male, 54 years old, healthy, and had suffered a fall from his own height in the past, in which the upper left lateral incisor was broken. On clinical examination (Fig. 1), a root fracture was found at the subgingival level and apparently infra-osseous, later confirmed through imaging tests (CBCT and peria-

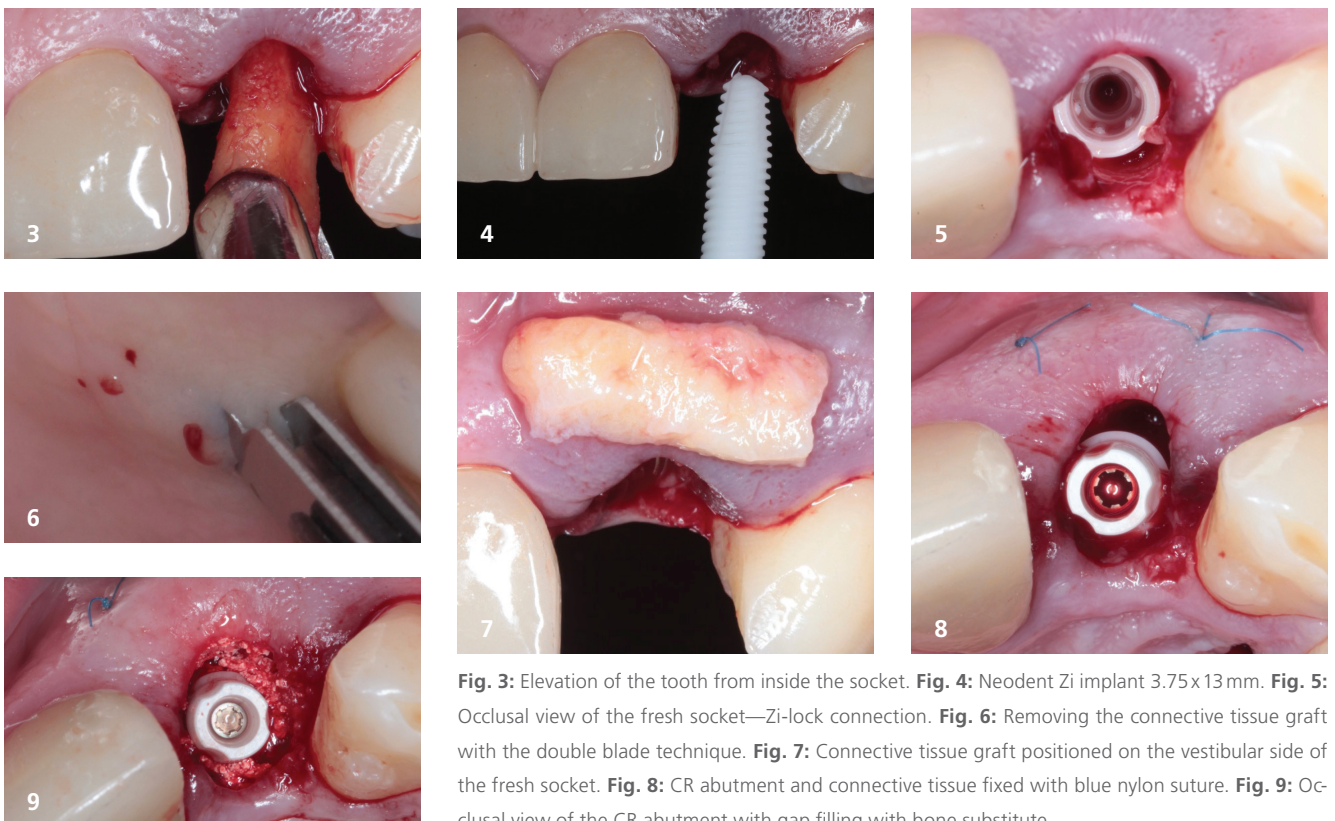
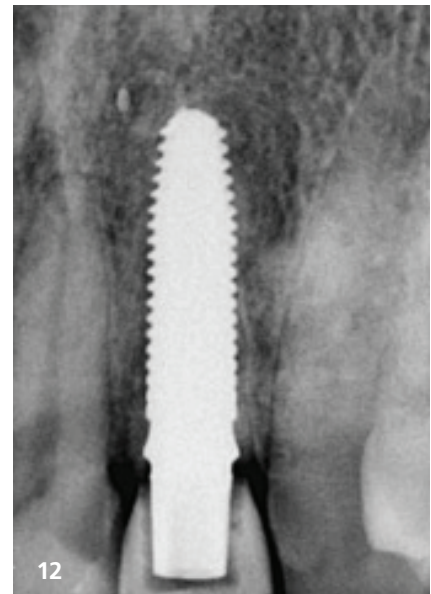
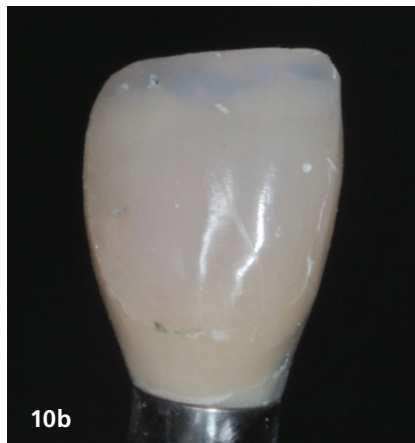
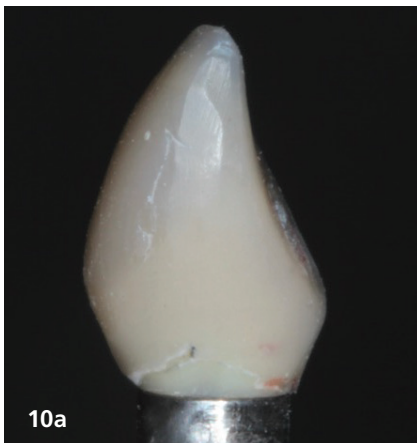


Fig. 3: Elevation of the tooth from inside the socket. **Fig. 4:** Neodent Zi implant 3.75x13 mm. **Fig. 5:** Occlusal view of the fresh socket—Zi-lock connection. **Fig. 6:** Removing the connective tissue graft with the double blade technique. **Fig. 7:** Connective tissue graft positioned on the vestibular side of the fresh socket. **Fig. 8:** CR abutment and connective tissue fixed with blue nylon suture. **Fig. 9:** Occlusal view of the CR abutment with gap filling with bone substitute.



Figs. 10a & b: Temporary crown made of light-cured resin. **Fig. 11:** Temporary crown positioned and sutured. **Fig. 12:** Immediate postoperative radiographic image. **Figs. 13a & b:** 14 days postoperative—suture removal.

pical X-ray, Figs. 2a & b). Given the clinical and radiographic situation, the proposed treatment was the extraction of the upper left lateral incisor with immediate placement of a ceramic implant and prosthetic rehabilitation through an immediate temporary crown and CTG using the double blade technique (DBT).

Surgical procedure

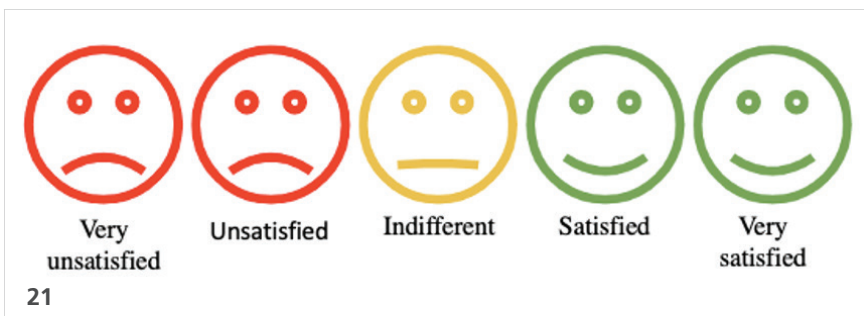
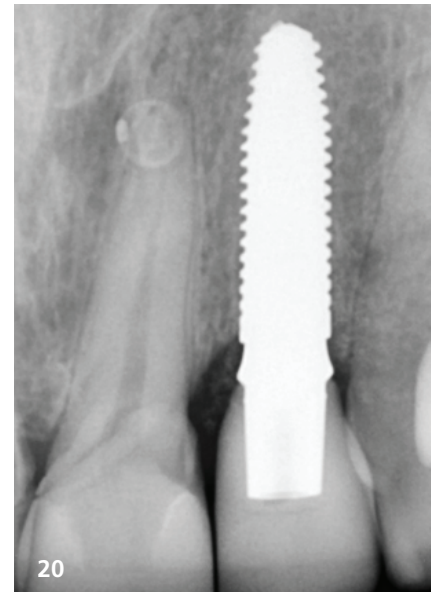
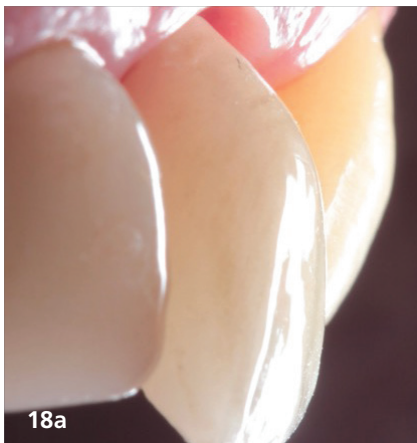
The patient was instructed to perform antibiotic prophylaxis with four tablets of Amoxicillin 500 mg one hour beforehand and rinsed the mouth with 0.12% chlorhexidine for 30 seconds before receiving local anaesthesia with 4% Articaine (1:100,000 epinephrine). Then, the extraction was performed atraumatically with the aid of manual periostomes and forceps (Fig. 3) and a two-piece ceramic implant (Neodent Zi Ceramic Implant®, 3.75 x 13.0mm) was placed in the fresh alveolus (Fig. 4). The Insertion torque was 35Ncm. It should be noted that the in-

strumentation of the surgical site was carried out in accordance with the manufacturer's guidelines, including the use of "the countersink" and the "former screw"

to facilitate the seating of the implant in the recipient bed. After thorough milling, the implant was placed with the help of a surgical contra-angle at a rotation of



Fig. 14: Four months of follow-up. **Fig. 15:** Peri-implant tissue with a healthy appearance (occlusal view). **Fig. 16:** Peri-implant tissue with a healthy appearance (lateral view). **Fig. 17:** Closed impression technique with flow resin to copy the gingival emergence profile and addition silicone (Yllor).



Figs. 18a & b: e.max crown being positioned over the CR abutment with maintenance of interden- tal papillae and peri-implant volume. **Fig. 19:** e.max crown cemented. **Fig. 20:** 12-month follow-up X-ray. **Fig. 21:** Visual analogue scale.

30rpm with 35Ncm of torque, at the level of the bone crest (Fig. 5).

On the vestibular area, a CTG was removed from the patient's own palate using the DBT (Fig. 6) and fixed with Blue Nylon 6/0 suture (Techsuture; Figs. 7 & 8). To fill the "gap" between the external wall of the implant and the internal surface of the buccal wall of the alveoli, a bone substitute was used (Straumann® maxresorb® 0.5–1.0mm, 0.5cc; Fig. 9). A 4.5x5.0x1.5mm (regular) zirconia abutment (CR Zi Pillar®) was installed (Figs. 10a & b). Finally, a provisional restoration was made with light-cured composite resin and cemented on the ceramic abutment (Fig. 11).

At the end of the surgical procedure, a periapical X-ray was taken (Fig. 12). The Patient returned 14 days later for suture removal (Figs. 13a & b) and received the necessary instructions. The four-month postoperative period was uneventful, and after this period, the patient returned in order to begin the prosthetic rehabilitation phase.

Prosthetic phase

After four months (Figs. 14–16), the patient returned to have the definitive crown made. This crown was fabricated using the analogic with a conventional impression that was taken with addition silicone with putty and regular body (Yllcr; Fig. 17), using the closed tray technique. One lithium disilicate crown (e.max®) was manufactured and cemented with adhesive cement (RelyX™ U200, 3M) onto the prosthetic abutments (Figs. 18 & 19). Occlusal adjustments were performed. At the end of the treatment, a final periapical X-ray was taken, and it was possible to observe the bone stability and the adaptation of the prosthetic work (Fig. 20).

Then, the patient was questioned and instructed to respond about the degree of satisfaction with the treatment through a VAS (visual analogue scale) and answered that he was "very satisfied" (Fig. 21).

After 12 months, the patient was asked to return and a new X-ray was taken,

showing the stability of the alveolar bone crest without marginal bone loss (MBL).

Discussion

The aim of this case report was to demonstrate the step-by-step oral rehabilitation in the aesthetic area with immediate loading and immediate provisionalisation using ceramic implants and connective tissue grafts and its clinical and radiographic performance after a 12-month follow-up period. After 12 months, as proved in other studies that also used this implant system,^{8–10} it was possible to observe that over the course of a year, no biological or prosthetic complications were observed, with the peri-implant tissues remaining stable and healthy.

The MBL around the dental implant is considered one of the key points in observing the success of a treatment.¹¹ In this case report, the MBL measurement was performed and confirmed by two professionals, a specialist in implant den-

tistry and easy-to-apply oral and maxillo-facial surgery. Both observed and agreed that after the 12-month follow-up period, no MBL was observed. Our MBL findings are in line with those reported in studies previously published in the current literature, where MBL observed in two-piece zirconia implants was < 3 mm, but this study presents a nine-year follow-up.¹²

Immediate placement and provisionalisation of implants have gained considerable scientific interest in recent decades, minimising the number of surgical interventions and helping to maintain soft and hard tissues around implants.¹³ Even so, the remodelling of oral soft and hard tissues after tooth extraction tends to

happen, especially in the first year of operation.^{14–16} In the present case report, a joint tissue graft was used in order to maintain peri-implant architecture and aesthetics. Studies show that the use of connective tissue grafts helps maintain the volume of soft tissue around the implants, preventing aesthetic collapse and, consequently, improving pink aesthetics.¹⁷

To assess the level of patient satisfaction, a VAS scale was used where the patient demonstrated that he was “very satisfied” with the treatment, as occurred in another previously published study using another ceramic implant system which demonstrated that patients were very satisfied with the final treatment.¹⁸

Conclusion

According to the present case report, clinical and radiographic results demonstrated that this new two-piece zirconia implant (Neodent Zi) presents favourable performance in relation to osseointegration and maintenance of peri-implant health, making it a safe option for oral rehabilitation involving aesthetic areas.

Author details



References



About the authors

Dr Alexandre Marques Paes da Silva is a lecturer in the department of prosthodontics of the faculty of dentistry at the Universidade do Estado do Rio de Janeiro in Brazil. He can be contacted at xandemps@gmail.com.

Dr Dennis de Carvalho Ferreira is a lecturer in the microbiology department of the faculty of dentistry at the Universidade Estácio de Sá in Rio de Janeiro in Brazil.

Dr Thamires Alves Silva has a position in the faculty of dentistry at the Universidade Federal Fluminense in Niterói in Brazil.

Dr Mayla Kezy Silva Teixeira is a lecturer in the department of prosthodontics of the faculty of dentistry of the Universidade do Estado do Rio de Janeiro in Brazil.

Dr Daniel de Moraes Telles is a full professor in the department of prosthodontics of the faculty of dentistry of the Universidade do Estado do Rio de Janeiro in Brazil.

Dr Eduardo José Veras Lourenço is an associate professor in the department of prosthodontics of the faculty of dentistry of the Universidade do Estado do Rio de Janeiro in Brazil.



Contact address

Alexandre Marques Paes da Silva

Rua das Bromélias, 400,
Bl 1/1402, Barra da Tijuca,
Rio de Janeiro – RJ – Brazil
xandemps@gmail.com
+55 21 997905289

¹ Department of Prosthodontics, Faculty of Odontology, Rio de Janeiro State University, Rio de Janeiro, Brazil

² Microbiology department, Faculty of Odontology, Estácio de Sá University, Rio de Janeiro, Brazil

³ Hospital Federal dos Servidores do Estado, Fluminense Federal University (UFF)—Niterói

⁴ Veiga De Almeida University, Rio de Janeiro, Brazil