

Case Report Article

Alternative soft tissue management techniques in posterior region of immediate implant

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Abstract

Introduction: Management of soft tissues in posterior region after immediate implant placement is a treatment widely performed in the dentists' clinical practice. However, due to many particularities of this kind of treatment it is still considered a great challenge. **Objective:** In this way, the aim of this paper is to report three cases that describe an alternative and simpler direct technique of customized immediate posterior healing abutment after immediate implant placement. **Case report:** The cases were performed using an alternative technique of customized immediate posterior healing abutment, which aims to guide the peri-implant tissue healing, preserving the anatomic emergence form and avoiding the need of a second surgery. **Conclusion:** We could observe that customized healing abutments assist in tissue stability, facilitate hygiene during the healing period, reduce the number of surgery steps, reduce the amount of consultations for tissue conditioning and it is a more cost-effective treatment for the patient and professional.

Introduction

The implant placement immediately after tooth extraction with immediate loading has become more common and it has demonstrated to have some advantages in comparison to the protocol of conventional delayed implants. Among the advantages, shortening treatment time, reducing the number of surgical interventions, providing

faster comfort/esthetics, and higher cost-efficiency are the most reported in the available literature [4].

However, even though immediate loading is a predictable technique [3], some authors believe that it seems to be more risky in posterior region and many dental surgeons are afraid to perform this technique because the masticatory forces in this area [1]. The posterior teeth can present a huge challenge depending on the crestal socket

morphology, the large extraction socks that are difficult to seal without mucoperiosteal flap reflection, and the possibility of high occlusal forces that are not desired over the provisional crown [7].

Nevertheless, a careful tooth extraction, followed by the placement of an immediate implant and a provisional crown used to be the option of choice when a second surgical stage want to be avoided and the architecture of tissues want to be preserved [12, 13]. Despite the high primary stability of the implants makes it possible to perform immediate loading, some precautions such as avoiding excess of occlusal forces in the initial phase must be respected for implant survival [5].

In this sense, seeking to overcome these challenges and considering the new demand for minimally invasive procedures, some clinical approaches have been proposed, such as the use of a customizable healing abutment. This technique would be an alternative to guide the soft tissue healing and preserves the anatomic emergence form, avoiding the possible risk of mechanical overload and impaired osteointegration [1].

Moreover, the use of customized immediate posterior healing abutments provide the sealing of the implant and protect the bone substitute during healing, preventing food impaction, and leading to an individualized healing, which favors the clinical result of the definitive crown, which presents a better stability of the peri-implant soft tissues [6, 11].

Until then, there are a few number of published cases in the current literature that have demonstrated and reported this customizable healing abutment technique and discussed the benefits of using it. Furthermore, the posterior region has some challenges and it is important to investigate and show how this technique behaves in posterior teeth.

In this way, the aim of this study was to report a series of cases that used a customized immediate posterior healing abutment technique for peri-implant tissue management after immediate implant placement, demonstrating the importance of knowing this technique.

Case report

This clinical report is described following the CARE guidelines [10]. The authors declare that they have obtained the patient consent form.

Case 1: Abutment for cement-retained

A 54-year-old woman with no relevant medical historic sought dental care with the main complaint of continuous pain in the mandible. Clinical and tomographic evaluation revealed a longitudinal fracture in the mandibular right first molar, compromising the maintenance of the tooth (figure 1a). Once the need for extraction was confirmed, the installation of an immediate implant and a customized healing device was planned.

A minimally traumatic tooth extraction with odontosection (figure 1b) was performed aiming to preserve the integrity of the surrounding soft and hard tissues (figure 1c).

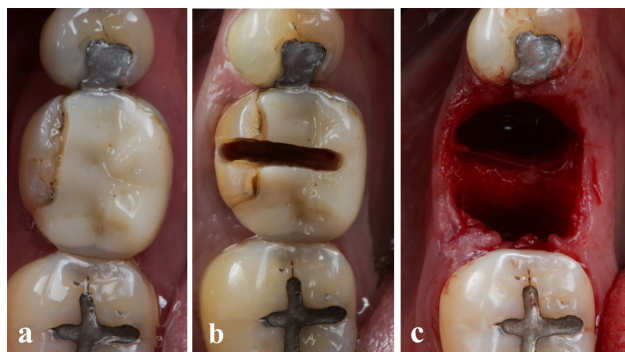


Figure 1 - (a) Initial intraoral occlusal view; (b) Minimally traumatic tooth extraction with odontosection; (c) Occlusal view showing the integrity of the soft and hard tissues after tooth extraction

After removal, the alveolar socket was irrigated and curetted using a manual instrument and the implant drilling was realized in the bone septum (figure 2a). Then, a morse taper frictional implant with 3.8 mm diameter and 8 mm length (Arcsys, FGM, Joinville, Brazil) was immediately installed with a torque of 45N/cm (figure 2b).

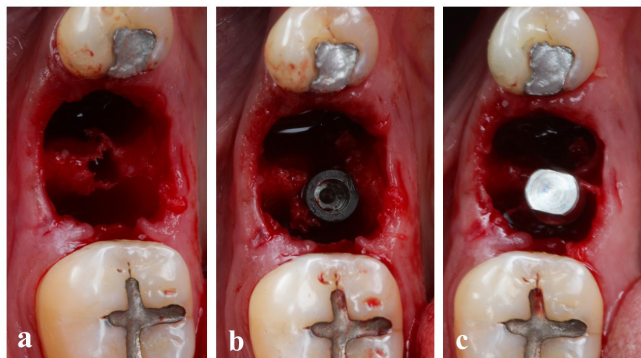


Figure 2 - (a) Implant drilling in the bone septum; (b) Implant installation; (c) Abutment installation

As a high primary stability was achieved, the abutment for cement-retained (Arcsys, FGM, Joinville, Brazil) was installed (figure 2c) and the provisional cylinder was captured using flowable resin (Opallis, FGM, Joinville, Brazil) and dental curing light, for performing the customized healing abutment (figure 3a). After the cylinder is captured, the set is removed and critical/subcritical contour is performed out of the mouth with flowable resin, finalizing the emergency profile with adequate polishing.

The gaps were filled with a synthetic bone substitute (Nanosynt, FGM, Joinville, Brazil) (figure 3b), and it was cemented the customized healing with temporary cement (Temp-Bond, Kavo Kerr, Berlin, Germany) (figure 3c). After finishing the surgery, an immediate radiograph of the operated region was performed (figure 4).

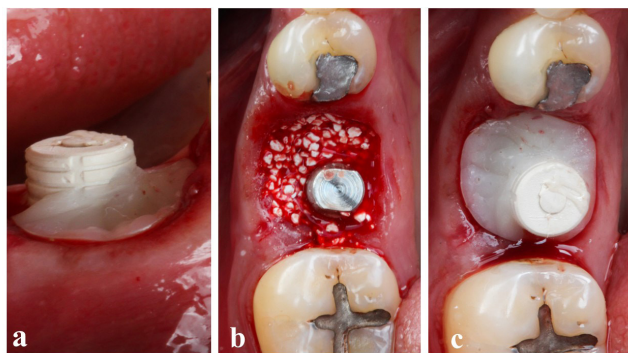


Figure 3 - (a) Cylinder capture using flowable resin and dental curing light, for performing the customized healing abutment; (b) Gaps filled with a synthetic bone substitute; (c) Cementation of the customized healing with temporary cement



Figure 4 - Immediate radiograph of the operated region

Three months later, the optimal gingival architecture was achieved (figure 5a), being healthy and ready to start the implant-supported prosthesis. Due to the use of the personalized healing, there was no need to have additional consultations for tissue conditioning. Then, a single-step addition polyvinyl siloxane impression (Virtual, Ivoclar Vivadent, Schaan, Liechtenstein) was performed and sent to the laboratory to start the crown fabrication. Finally, the metallic-ceramic crowns were delivered and installed, obtaining an excellent esthetic result with an optimal and natural emergence profile, attending the patient's main complaint (figure 5b and figure 6).

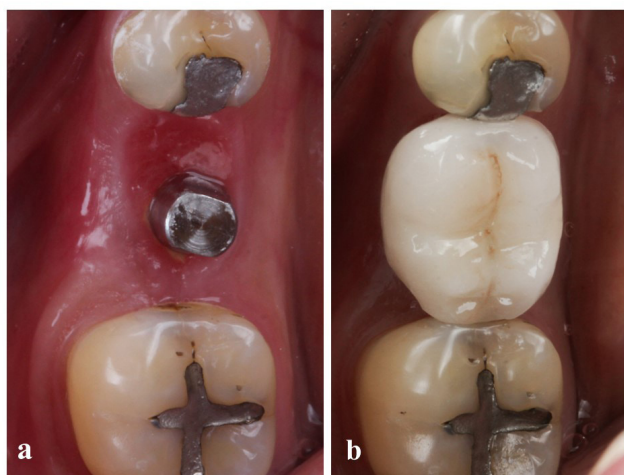


Figure 5 - (a) Image showing the optimal gingival architecture achieved after three months; (b) Final prosthesis



Figure 6 - Final radiograph

Case 2: UCLA abutment

The patient, a 29-year-old woman, sought dental care with the primary complaint that she was dissatisfied about the esthetics of her smile and her masticatory function. Intraoral clinical examination revealed the presence of the maxillary left second premolar residual root and tooth loss (maxillary left first molar) (figure 7a). Tomographic exam showed the need to remove the residual root and perform maxillary sinus lift surgery in the left posterior region, allowing the installation of implants and prosthetic rehabilitation.

At the same surgical moment, the residual root was carefully extracted with minimal traumatic technique and maxillary sinus augmentation was realized, avoiding a second surgery stage. The implants with 3.5 mm diameter and 11.5 mm length (Strong, SIN, São Paulo, Brazil) were immediately installed with a torque of 45N/cm and gaps in the alveolar socket and in the cavity of the sinus were filled with a synthetic bone substitute (Bio-Oss, Geistlich, Switzerland) (figure 7b).

Seeking to protect the bone substitute, we adapted a rubber dam in the region of the implants and installed the metallic UCLA abutments to custom the customized healing abutments using flowable resin. Next to that, abutments were removed and finishing and polishing were then performed. After completion, the abutments were installed over the implants, the suture was realized (figure 7c)

and an immediate radiograph was performed for control (figure 8).

Six months past of the surgery, the patient returned and the customized healing was removed. In this appointment we could observe excellent healing and the conservation of peri-implant tissue (figure 7d), showing that the use of a customized healing optimizes the prosthetics' clinical time as it reduces the number of consultations for gingival tissue conditioning.

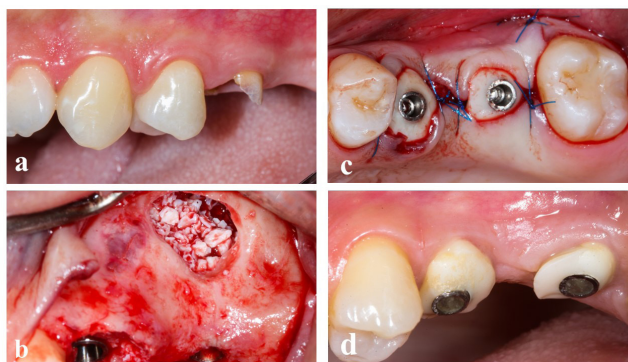


Figure 7 - (a) Initial intraoral view demonstrating the presence of the maxillary left second premolar residual root and tooth loss (maxillary left first molar); (b) Maxillary sinus augmentation surgery and implants installation. The gaps in the alveolar socket and in the cavity of the sinus were filled with a synthetic bone substitute; (c) After customizing the abutments the suture was realized; (d) Six months past of the surgery, we could observe excellent healing and the conservation of peri-implant tissue

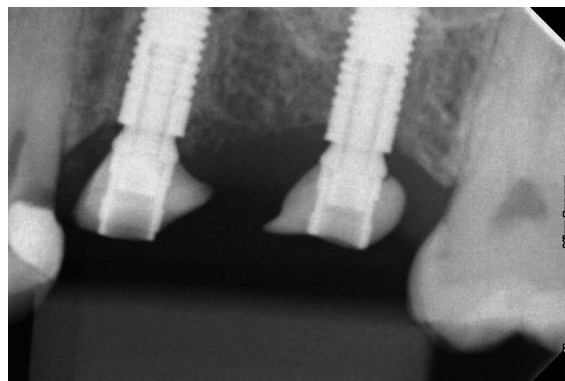


Figure 8 - Immediate radiograph

After this healing period, the implant-supported prosthesis was finalized (figure 9) and a final radiograph was performed (figure 10).



Figure 9 - Final result

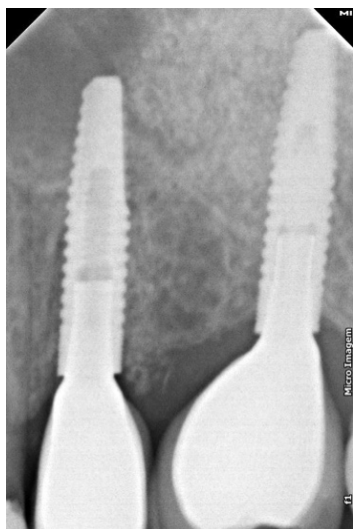


Figure 10 - Final radiograph

Case 3: Polyether-ether-ketone prefabricated healing abutment

A 34-year-old man sought dental care due to a mobility of his mandibular left first molar. The patient was examined, and it was observed tooth mobility and a fracture of the restoration-tooth set (figure 11a). The diagnosis of longitudinal fracture of his mandibular left first molar was confirmed through the tomographic exam.

The compromised tooth was extracted following the same minimally invasive protocol of tooth extraction, using the odontosection technique (figure 11b). Thereafter, a morse taper frictional implant with 3.8 mm diameter and 9 mm length (Arcsys, FGM, Joinville, Brazil) was immediately installed in the bone septum with a torque of 45N/cm (figure 11c).

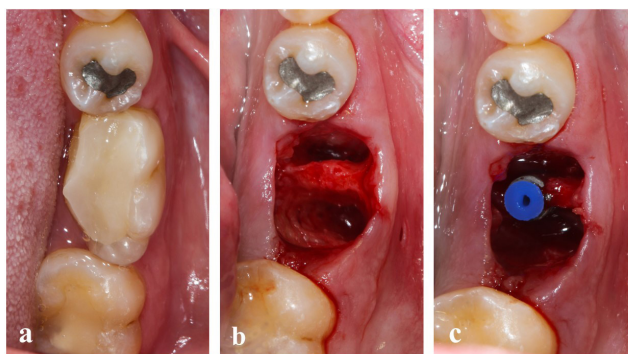


Figure 11 - (a) Initial introral view showing a fracture of the restoration-tooth set; (b) Tooth extraction with minimal traumatic technique; (c) Implant installation

In this case, a prefabricated healing abutment made of polyether-ether-ketone (PEEK) (Arcsys, FGM, Joinville, Brazil) was used to perform the customized healing abutment. The prefabricated abutment was placed in position, over the implant, and flowable resin was applied around the abutment and light-cured, aiming to copy the gingival profile. Then, the customized healing abutment was removed and finalized out of the mouth with flowable resin and polishing drills/brushes.

Aiming to fill the gaps around the implant, it was used a synthetic bone substitute (Nanosynt, FGM, Joinville, Brazil) in the alveolar socket (figure 12a). The customized healing abutment was placed over the implant and a suture was realized (figure 12b). An immediate radiograph was also performed (figure 13).

Three months later, the customized healing abutment was removed and it could be observed an optimal soft tissue contour and excellent healing (figure 12c).

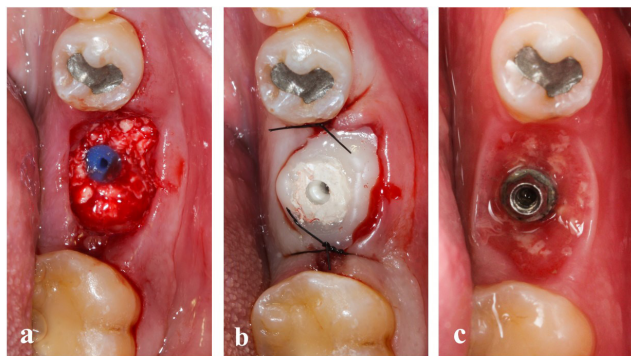


Figure 12 - (a) Gaps around the implant filled with synthetic bone substitute; (b) Customized healing abutment was placed over the implant and a suture was realized; (c) Optimal soft tissue contour and excellent healing



Figure 13 - Immediate radiograph



Figure 14 - Definitive prosthesis installed



Figure 15 - Final radiograph

Discussion

An oral rehabilitation with immediate implant placement in posterior region presents some relevant challenges in implant dentistry, such as the risk of mechanical overload and possible failures in osseointegration. Besides that, the growing aesthetic demand of patients shows the necessity of being concerned with mimicking the natural conditions of the region to be rehabilitated, always seeking to preserve soft and hard peri-implant tissues.

The reported cases were performed using an alternative technique of customized immediate

posterior healing abutment, which aims to guide the peri-implant tissue healing, preserving the anatomic emergence form and avoiding the need of a second surgery stage [1]. In this way, this alternative treatment costs less for the patients and it is faster, thus being more comfortable for them.

In addition, this technique is very versatile, since you can use different kinds of prosthetic components from different implant systems to perform it, as we can observe through our reported cases. Three types of components were used for perform the customized healing abutment achieving similar results.

Moreover, there are other alternative techniques about customized healing abutments described in the literature. Some authors defend the approach of using a computer-aided design and computer-aided manufacturing (CAD/CAM) to fabricate the customized healing abutment [2]. Different researchers have described an indirect technique, where you perform the customized abutment in a cast, before the surgical step [14]. However, we believe that the technique that we used in the reported cases are simpler, faster and demand less cost for the patient in comparison with the others described in the available literature.

Furthermore, the management of peri-implant tissues and the natural cervical contour is important not only for aesthetics reasons but also for hygiene. A recent study that aimed to observe the effect of individualized healing abutment on patients with posterior dental implant prosthesis and its influence on implant stability and food impaction, found that the personalized healing abutment has a good therapeutic effect on patients with posterior implant prosthesis, and can significantly improve the incidence of food impaction and complications in comparison with the traditional operation group [8]. These results are very interesting because they highlight some of the many benefits of using a customized healing abutment and they demonstrate that it has a huge impact on the implant survival and on patient's quality of life.

In addition, it is worth mentioning that a study published in 2019, observed that the customized healing abutments have shown the most favorable outcomes (in terms of papilla index and mesial bone loss) in comparison with standard healing abutments group, demonstrating another important benefit from personalized abutments in long-term [9].

Besides these, there are others benefits that have been showed in our cases, such as the capacity of peri-implant tissues management and

the stabilization of the bone substitute. The benefits demonstrated in this study according to the available literature highlight the predictability and versatility of the described technique.

Conclusion

The chosen technique performed in these cases demonstrated to be an adequate and reliable clinical option for maintaining the peri-implant soft tissue in posterior region after an immediate implant placement. Furthermore, we could observe that customized healing abutments assist in tissue stability, facilitate hygiene during the healing period, reduce the number of surgery steps, reduce the amount of consultations for tissue conditioning and it is a more cost-effective treatment for the patient and professional.

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