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Case Report

Rehabilitation of Anterior Tooth Loss with Immediate Implant and Preservation of Gingival Aesthetics with Use of Vertical Extraction System and Customized Healing Abutment made by CAD-CAM Technology: Case Report

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Abstract:

Objective: Patients with the need to perform anterior unit rehabilitation with dental implants provide a great aesthetic challenge to the dental surgeon. Both from the point of view of the dental crown and from the point of view of maintaining the gingival tissue its emergence profile.

Material and Method: This article will present a case report of rehabilitation with an immediate dental implant, using the technique of vertical extraction system, to promote the maximum maintenance of personalized gingival tissue, as well as the use of making a customized healing abutment over the implant and later provisional, both created with the CAD-CAM CEREC system.

Result: The patient assumed a Straumann dental implant immediately after the extraction of the tooth with the installation of a customized healing abutment and temporary crown, both in PMMA and design with the use of the CAD-CAM CEREC system.

Conclusion: The dental extraction of the compromised tooth using an atraumatic technique and the immediate installation of a dental implant, provides a favorable aesthetic gain concerning the maintenance of the gingival profile. The creation of a customized healing abutment that copies the gingival profile further increases the likelihood of maintaining gingival aesthetics and, consequently, the final quality of the work performed. The use of chairside CAD/CAM technology is of great value to get the quick form of customizable components and provide patient care in a single session.

Keywords: Immediate implant, customizable healing abutment, CAD-CAM in dentistry, gingival profile, atraumatic extraction, vertical extraction system.

Introduction

Treatment with dental implants in areas with tooth loss has become over the years one of the best options, both for the maintenance of bone tissue and for the preservation of adjacent teeth by avoiding solutions such as fixed bridges.

Performing dental implants immediately after the extraction of the compromised tooth, when properly attributed, promotes faster healing, favors the quality of osseointegration [1], and requires the necessary time to complete the treatment. In addition, there is a reduction in alveolar bone resorption both horizontally and vertically, better preservation of the surrounding gingival tissues, and preservation of the papilla in the esthetic zone. [two] Seeking the state-of-the-art in peri-implant aesthetics in immediate osseointegrated implants, the use of atraumatic extractors such as BENDEX is of great importance for the maintenance of the gingival profile as well as the creation of a fitting sealing abutment (SSA).

Such extractors are supplied to extract teeth without expansion of the alveolar bone through the exclusive application of vertical layers, thus minimizing trauma to the root surface and also to the alveolar bone, as well as presenting great predictability in the procedure [19, 20, 21].

The maintenance of the gingival architecture is reported by several authors, obtaining excellent esthetic results with the use of personalized wound healing. [3-9]

In seeking to create a natural look the gingival contours of the soft tissue must be maintained. Therefore, obtaining a customized healing abutment can add stability and maintenance of soft tissue contours. [10-16]

With the aid of CAD-CAM, it is possible, through intraoral scanning, to obtain the virtual model, avoiding possible contamination with molding materials, and copy exactly the gingival profile of the area where extraction was performed.

With this abutment, the alveolus is closed at the time of extraction, and for this, the digitally generated protocol that was established to allow this customized CAD / CAM abutment to be installed at the time of surgery must be observed [17].

This snap-in sealing abutment (SSA) is generated chairside (CAD / CAM) at the time of the intervention, with the milling of a PMMA block, obtaining the exact custom of the gingival profile design through the making of the healer and thus maintaining the soft tissue with a support structure similar to that implanted by the tooth root [18].

Case Report

A 20-year-old male patient presented to the private clinic with a chief complaint of poor smile esthetics due to the presence of caries in his upper incisor. In the initial medical screening, it was found that the patient had no history of smoking and had no history of diabetes, enjoying good general health.

During the clinical examination, it was found that the patient had no tartar, good oral health, except for the presence of decayed tissue in his upper left incisor, which significantly affected the dental crown and part of the tooth root (Fig.01). The radiographic examination also showed the presence of severe root caries with exposure to the root canal (Fig 02).

The patient reported that he did not feel pain and that the history of dental caries in this element began at least 3 years ago and that fear of dental treatment prevented him from seeking adequate treatment.

It was then proposed to the patient to perform an atraumatic root extraction surgery, minimizing surgical morbidity and immediate installation of a dental implant at the extraction site, with the creation of a customized healing abutment to maintain the gingival profile, thus eliminating the need for suture. It was proposed to make a provisional in PMMA fixed with composite resin in its adjacent teeth to wait for the implant osseointegration period.

The procedure was indicated with the use of conscious sedation with nitrous oxide, aiming at comfort and overcoming the fear and discomfort that the patient had about dental treatments.

Therefore, after starting the procedure of conscious sedation and infiltrative anesthesia, the tray of the vertical extraction system was customized with condensation silicone and the system's intraradicular pin was installed through the perforation of the root and then its threading, as recommended by the technique. (Fig. 03).

Figure 1: *Initial condition. Decay tissue compromising the tooth.*

Figure 2: *Periapical X-Ray.*

Figure 3: *Installation of the root pin and support tray of the extraction system.*

Then, the tooth root was removed using the vertical extraction system with the extractor (Fig. 04 and Fig. 05) and the predictability of the technique was very satisfactory, maintaining the integrity of the gingival tissue (Fig. 06 and Fig. 07).

The installation of the 4.1 x 12 mm Straumann BLT SLActive immediate dental implant is then concluded (Fig. 08), and the installation of the TiBase component (Fig. 09) over it, following the placement of the scanbody on the component (Fig. 10).

An oral scan was then performed (Fig. 11) with an Omnicam CEREC (Sirona) scanner and a customized healing abutment design was given in the CAD software inLab 4 (Fig. 12, Fig. 13). Once completed, it was then sent to the CAM system, MCXL CEREC (Sirona) milling machine, to obtain the part by milling (Fig. 14).

Once the personalized healer was obtained in a PMMA block, it was cemented with Rely-X 3M cement over the TiBase component (Fig. 15) and asepsis was performed with 2% chlorhexidine, to then be screwed onto the implant in the cavity buccal (Fig. 16, Fig. 17).

Afterward, the hole was closed with composite resin and a new buccal scan was performed with the customized healing abutment already in position (Fig. 18).

After this new scan, the temporary crown was designed in the CAD software inLab 4 (Fig. 19) following its milling in a PMMA block (Fig. 20).

Once the milling of the crown was finished, the composite resin was applied to its proximal and it was adhesively fixed to the adjacent teeth (Fig. 21, Fig. 22).

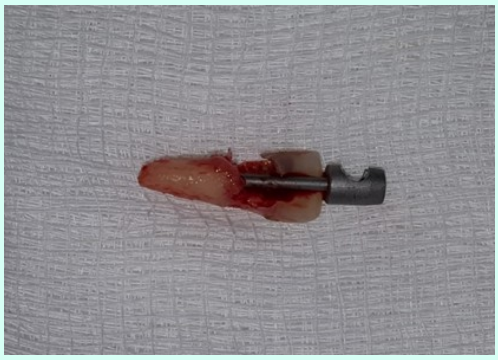

Figure 4 and 5: *Vertical extraction executed.*

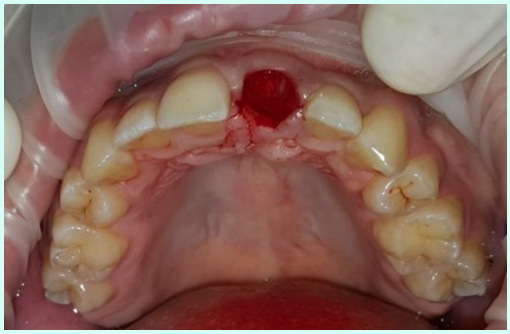

Figure 6 and 7: *Maintenance of the gingival profile. Minimal trauma*

Figure 8: *Immediate implant installation.*

Figure 9: *TiBase installed*.

Figure 10: *Scanbody in position.*

Figure 11: *Buccal scan executed.*

Figure 12 and 13: *Customized abutment design in software inLab 4.*

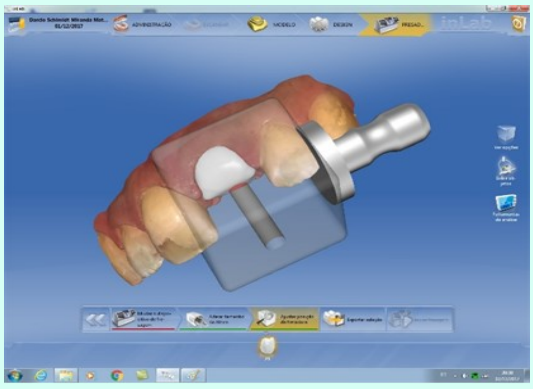

Figure 14 and 15: *Customized abutment milled in PMMA block and bonded over the TiBase.*

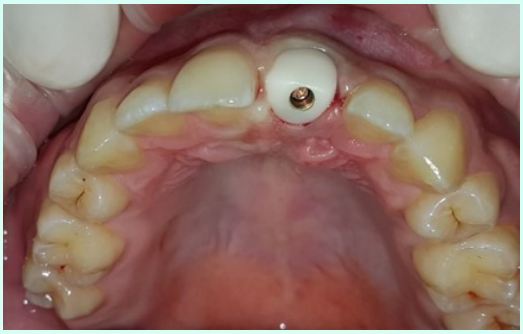

Figure 16 and 17: *Customized abutment instaled over the immediate implant.*

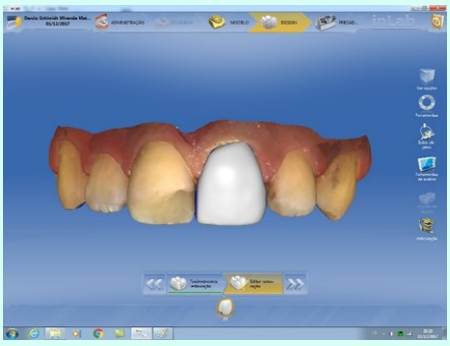

Figure 18 and 19: *New buccal scanning and temporary crown design.*

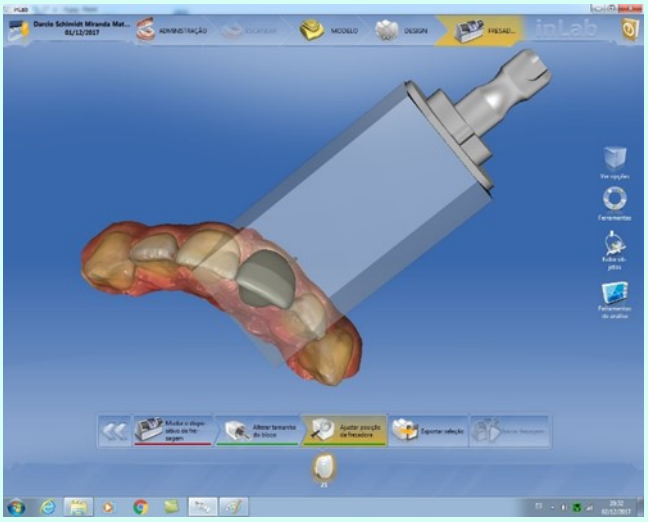

Figure 20: *Temporary crown milling in a PMMA block.*

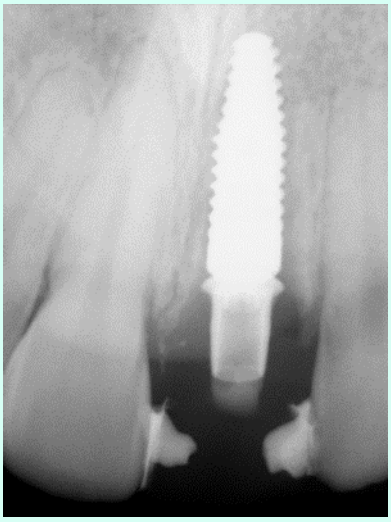

Figure 21: *Periapical X-Ray.*

Figure 22: *Final result. Temporary crown fixed in adjacent teeth using bond composite resin*.

Conclusion

In conclusion, this case presents the clinical surgical benefits of both the atraumatic extraction technique, using a vertical extractor system, and the use of a chairside intraoral scanner to obtaining customized healing abutment with CAD-CAM system in cases of immediate implantation, considering that the maintenance of the gingival tissue is extremely favoured well with the lesser trauma of the surgical act, providing greater comfort, no sutures, and predictability for the patient.

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