

# Overtreatment: an effective alternative in implant therapy on a single tooth with root resorption in patient with chronic periodontitis: a case report

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**Abstract:** A 54 year-old Caucasian male attended the private clinic for dental treatment. On anamnesis, he appeared to be a systemically healthy patient; the clinical and radiographic examination showed resorption of the apical and middle thirds of the # 21 tooth root. The treatment option was to perform the extraction of the dental element and immediate implant with late loading using the patient's own tooth as a provisional attached to adjacent teeth. The patient was made aware of the details of the pre, intra and post-operative phases, and authorized the treatment and photographic documentation for purposes of publication and dissemination. The use of a Periostome was required for atraumatic extraction. After atraumatic removal of the root and preserved remaining alveolar bone, it was chosen to perform an immediate implant placement (Neodent-Curitiba-PR, Brazil), of conical shape and Morse taper fitting. The alveolar-implant space was filled with Bio-Oss®; a subepithelial connective tissue graft was removed from palate, rotated to the buccal side and alveolar obliteration was conducted - at this stage, it is important to ensure graft immobility for revascularization. Next, the crown of the extracted element was used as a provisional tooth establishing a pontic attached with composite resin to elements 11 and 22. Accordingly, after the step of using the provisional pontic rebased with composite resin, the confection of the final prosthetic crown started. After three years of follow-up, it was concluded that the combination of techniques had predictable and satisfactory aesthetic results for the prevention of peri-implantar health as planned. **Keywords:** Dental Implantation. Biocompatible materials. Tissue transplantation. Gingival recession.

46

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## INTRODUCTION

The early loss of front teeth is a challenging situation especially because most dimensional changes of peri-implantal soft tissues occur during insertion of implants. The rehabilitation of single teeth in newly extracted alveoli is considered a major challenge in Implantology, requiring a highly complex intervention by the professional due to the degree of technical difficulty and aesthetic requirements in mimicking and reproducing the aesthetic aspects of the anterior region.

## METHODS

A 54 year-old Caucasian male attended the private clinic for dental treatment. On anamnesis, he showed to be a systemically healthy patient. Clinical and radiographic (Fig 15 to 18) examination showed resorption of the apical and middle thirds of the tooth root 21 with grade 2 mobility (Figs 1 and 2). The treatment option was to perform the extraction of the dental element (Fig 3) and immediate implant (Figs 4 and 5) with late load, using the patient's own tooth as provisional attached to neighboring teeth Figure 7. The patient was made aware of the details of the pre, intra and post operative phases, and authorized the treatment and photographic documentation for purposes of publication and dissemination. The procedure began with the sterilization of the patient, infiltrative anesthesia of the tooth 11 region with articaine 2% and noradrenaline (1/100.000). Intra-sulcular incision was made with 15 blade to access the periodontium.

The use of a periosteal elevator and hammer was necessary for an atraumatic extraction. After periodontium rupture, root luxation was eased and the remaining alveolar bone preserved. While curetting the socket, we



**Figure 1.** Initial photograph.



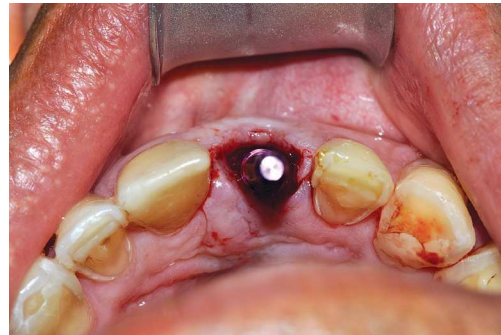
**Figure 2.** Close-up of element #21, with resorption.



**Figure 3.** After atraumatic extraction of element #21, with resorption.



**Figure 4.** Tridimensional positioning of the implant: buccal view, with parallelizer for mesiodistal reference.



**Figure 5.** Tridimensional positioning of the implant: occlusal view, for buccolingual reference.



**Figure 6.** Gingival graft donor site: seven days after removal of suture.



**Figure 7.** Gingival graft: observe the buccal volume obtained after seven days.

assessed the remaining osseous walls, not verifying any buccal resorption. Therefore, immediate implant placement (Neo-dent - Curitiba/PR, Brazil) of Drive type, size 4.3 x 13mm conical shape and Morse taper fitting was chosen. The following drilling was carried out according to the manufacturer's recommendations. After locking the implant in 45N/cm, as measured by a surgical torque wrench, a soft palate tissue graft was removed with two 90° incisions and a five minute compression with gauze applied in order to reduce bleeding and then suture with nylon 4-0 (Johnson & Johnson, New Paulo, Brazil).

The alveolar-implant space was filled with 0.25 g Bio-Oss® - particles of 0.25 - 1mm, using the technique of enveloping the subepithelial connective tissue graft from the palate to the buccal side and alveolar obliteration – at this stage, it is important to consider that the graft immobilization was crucial to their revascularization (Fig 9B)

Next, the crown of the extracted element was used as a provisional tooth establishing a pontic attached with composite resin to elements 11 and 22 (Fig 8). After 6 months, a supracrestal incision was made

and healing cap 4.5 x 3.5mm high installed; 7 days later, the final metal ceramic crown prosthetic phase started, with the installation of Universal Post prosthetics component of 2.5 x 6 mm (Neodent - Curitiba-PR, Brazil); and rebasing with composite resin of the same element used as provisional (Fig 10-12 resin). Thus, after the provisional step, the implementation of the final prosthetic crown started. The prosthetic component transfer molding was carried out and the prosthetic sequence of preparation: the metal coping tested and

its transfer molding made. Porcelain and glaze were applied in the selected color.

## CONCLUSION

After this sequence, the permanent cementation with zinc phosphate cement was made. Once occlusion was verified and adjusted, the patient was discharged and should return after six months (Figs 13 and 14). The patient follow-up has been done for three years and the peri-implant tissues have remained stable since the surgery.



**Figure 8.** Tissue cicatrization, after 30 days: occlusal view.



**Figure 9A.** Tissue cicatrization: buccal view of the graft, after thirty days. Provisional made with the own tooth of the patient, placed along to the adjacent teeth.



**Figure 9B.** Recipient site: buccal view, seven days after suture removal.



**Figure 10.** Vertical section for the provisional removal. Dental element of the patient relined with composite resin, installed 6 months after detected the implant osseointegration and 7 days after the installment of healers, for the gingival conditioning.



**Figure 11.** Prosthetic component: Universal Post of 4,5 x 6mm (Neodent, Curitiba/PR, Brazil ), for molding and preparation of the metal-ceramic crown, after gingival conditioning.



**Figure 12.** Prosthetic component: occlusal view. Gingival conditioning and papillae maintenance.

50



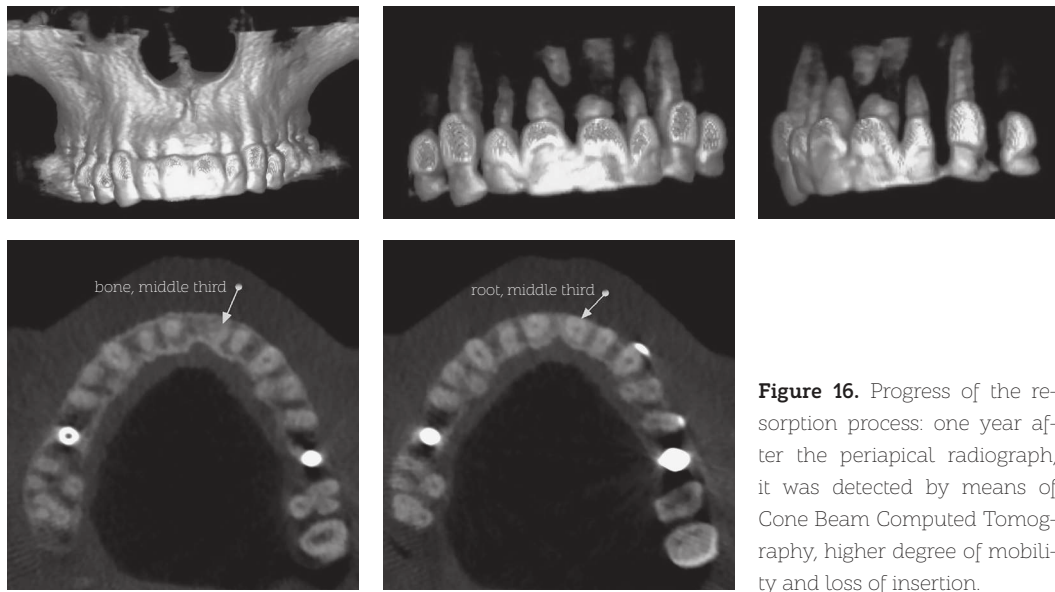
**Figure 13.** Final crown installed: architecture and gingival zenit following the same gingival level of element #11.



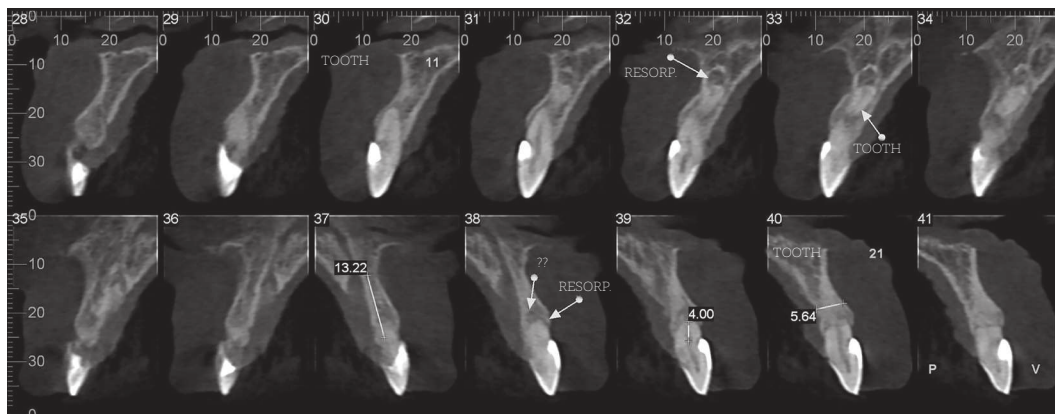
**Figure 14.** Follow-up after 3 years.



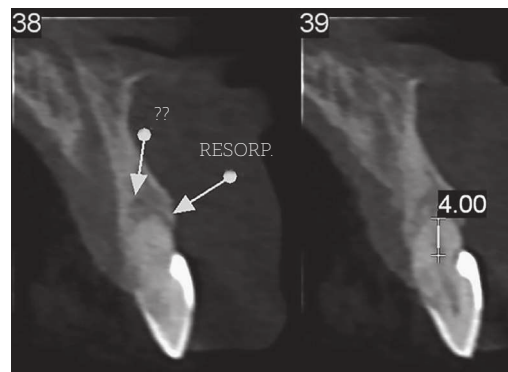
**Figure 15.** Initial radiograph, performed in 20/02/2011, for posterior follow-up.



**Figure 16.** Progress of the resorption process: one year after the periapical radiograph, it was detected by means of Cone Beam Computed Tomography, higher degree of mobility and loss of insertion.



**Figure 17.** Sagittal tomographic section (slice 33): it is observed the presence of a supernumerary in the periapex region of the element #11, to be preserved.



**Figure 18.** Sequence of slices 38 and 39: It is noticed an hypodense area in the periapex of the tooth #21, associated to the external resorption; it is noticed that the length of the root remnant is only 4,0mm; accentuated bone loss in the buccal and palatal crests may also be observed.

## DISCUSSION

The early loss of front teeth is a challenging situation especially when most dimensional changes of peri-implantal soft tissues occur during insertion of implants.<sup>1</sup>

In this case, with atraumatic extraction, the chances of peri-implantar gum recession decrease preserving the gingival architecture of the crests, and considering all clinical actions taken willing to minimize any aesthetic impairment that could potentially occur, thus adopting additional surgical procedures. Initial stability achieved during surgery would allow the immediate activation of the implant through the making and fitting of a provisional tooth. However, it was not done in order to establish gain of gingival thickness in consequence of an extremely thin gingival biotype.

Several techniques are adopted to implement gingival grafts, such as the lunate, the coronally positioned pedicle grafts, coronally repositioned flap with or without subepithelial grafts,<sup>3,10-13</sup> among others.

All techniques, when properly indicated, have good predictability and success rate. In the case presented, a connective tissue graft was necessary, considering exclusively the insufficient volume of gum, which would make gingival conditioning difficult for obtaining long-term aesthetics in the future rehabilitation. The placement of an implant, especially in the aesthetic area, is very challenging,

because if no further action is taken after the extraction of a tooth, the socket will not be filled with bone to the original level of the alveolar ridge.

In most cases, we observed resorption of buccal hard and soft tissues.<sup>26</sup> In patients with a thin periodontal biotype, and especially prominent roots, one would expect a greater loss of horizontal and vertical alveolar ridge volume.<sup>27</sup> Thus, horizontal bone loss is greater than vertical.<sup>28</sup> The patient presented a similar biotype, besides consequences of previous periodontal problems that theoretically would make it difficult to obtain clinical success. In addition, future bone deficiency in the buccal region could minimize the basic requirements for conducting an immediate implant with immediate load.<sup>14</sup> The absence of bone tissue as well as gingival recession may appear in the alveolar ridge due to tooth extractions, leading to changes in the topography of adjacent soft tissues, especially when this procedure leads to the buccal bone plate fracture or there is the presence of infections. However, Periodontics presents techniques that, when properly indicated, are able to restore volume, height and shape to the affected region.<sup>15</sup>

For these cases, there are biomaterials for grafting. These can be classified according to their origin into four major families: autogenous, homologous, and alloplastic xenogenic.<sup>16-17</sup> Autogenous biomaterial is obtained from donor areas of individuals of the same species as the

recipient; Xenogenic is obtained from individuals of different species from the receptor, and are usually obtained from cattle. Alloplastic may be of metallic nature, ceramic or polymeric.<sup>16-18</sup>

The main reason for alveolar dimensional changes following extraction of a tooth is the loss of fascicular bone; a structure related to the tooth that is lost when it is extracted. The buccal bone wall of the socket is very thin<sup>24</sup> and consists largely of fascicle bone. Thus, fascicle bone loss results inevitably in a drastic reduction of the vertical and horizontal dimensions of the alveolar ridge.<sup>25</sup> Besides this classification, others might be presented, since changes in technology and production of biomaterials and in obtaining bone substitutes are responsible for granting these materials the characteristics of osteoinductivity, osteoconductivity or osteogenesis.<sup>8,19-21</sup>

The purpose of these biomaterials is to act as helpers in tissue regeneration treatments. They present highly satisfactory clinical solutions with high success rate and minimal discomfort to the patient, being able to regenerate lost tissue and thus returning form and appropriate function.<sup>7,22</sup> Many biomaterials are considered an effective alternative to replacing lost tissue, including bone tissue, because they do not present risk of disease transmission or immune rejection, besides presenting a theoretically unlimited<sup>23</sup> supply. In the case presented, the space with absence of bone in the buccal region was filled with bovine hydroxyapatite. The association of biomaterial connective tissue graft not only allowed the recovery and return of the form of bone volume, preventing gingival recession, but also allowed better gingival conditioning.



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