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Case Report

Maintenance of Teeth Totally or Partially Included in The Path of Osseointegrated Implants – Presentation of A Case Series.

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Abstract:

Intraosseous retained teeth are identified through routine imaging exams, and can interfere with installing Osseo integrated implants, which aim to replace the impacted tooth itself, prosthetically. The extraction of these teeth may result in bone defects and, depending on the location of the tooth, complications such as temporary or permanent neurosensory damage and oro-antral communication. As an alternative to these treatments, maintaining the roots of impacted teeth associated with dental implants is an option, supported by the literature, although scarce. This approach was carried out in the five clinical cases presented in this article, although each had its particularities and follow-up periods. A common feature of the five cases would be the large bone defect and damage to the inferior alveolar nerve caused by the extraction of the impacted teeth. In none of the five cases did the patients report complications, and no complications were identified in the roots of the impacted teeth caused by the installation of the implants. This series of five cases provides clinical evidence capable of supporting the maintenance of both the roots of the impacted teeth and the impacted teeth, even with intimate contact or transfixation by the osseointegrated implant.

Key words: tooth impacted; dental implants; osseointegration; dental prosthesis; case series; maxillofacial surgery

Introduction

Permanent or supernumerary teeth that remain retained intraosseously are common and often do not impair tooth eruption or undergo pathological transformations and are only discovered through routine imaging exams (1,2). In some situations, these teeth that have not erupted can interfere with the possibility of installing Osseo integrated implants, often to replace the prosthetically included tooth itself.

Extracting these teeth can often result in a bone defect that is extremely difficult to repair. When located in the posterior region of the mandible, they can still result in temporary or permanent neurosensory damage, and the maxilla, they can result in oro-antral communication (3,4). These complications, in addition to increasing the complexity of rehabilitation, reduce patients' acceptance of treatment.

The aim of this study is to present 5 clinical cases involving implant and prosthetical rehabilitation which exctration of retained tooth was not necessary. This case series has been reported in line with the Process guidelines (5).

Materials and Methods

This study meets the PROCESS guidelines criteria (5). The authors discuss 5 clinical cases in which patients had impacted teeth that were maintained in whole or in part, allowing the installation of implants and prosthetic rehabilitation of the cases.

Results

Case 1: a 37-year-old patient sought treatment with osseointegrated implants to replace a removable prosthesis in the posterior region of the mandible. In the imaging exams, a lower premolar was discovered included in the edentulous area (figure 1). After evaluation by an orthodontic specialist, traction was ruled out. In an evaluation using cone beam tomography, a close relationship was observed between the tooth and the inferior alveolar nerve from the crown to the apex, the nerve was

embraced by the tooth (figure 2). When assessing the risk-benefit of tooth removal, the high chance of paresthesia was considered, in addition to a probable large height defect after tooth extraction.

Several alternatives were studied including conventional prostheses and extraction of teeth adjacent to the defect. In agreement with the patient, it was decided to install a short 6mm implant with a mesial cantilever, as it was the most conservative procedure possible.

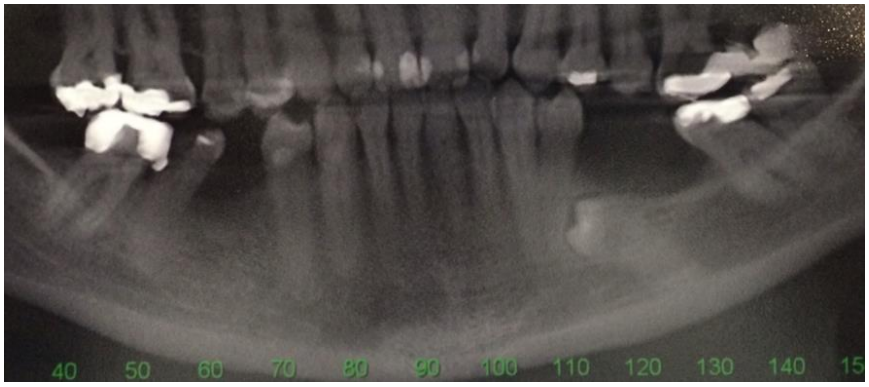


Figure 1: Panoramic radiograph showing an impacted premolar in an edentulous area (third quadrant).

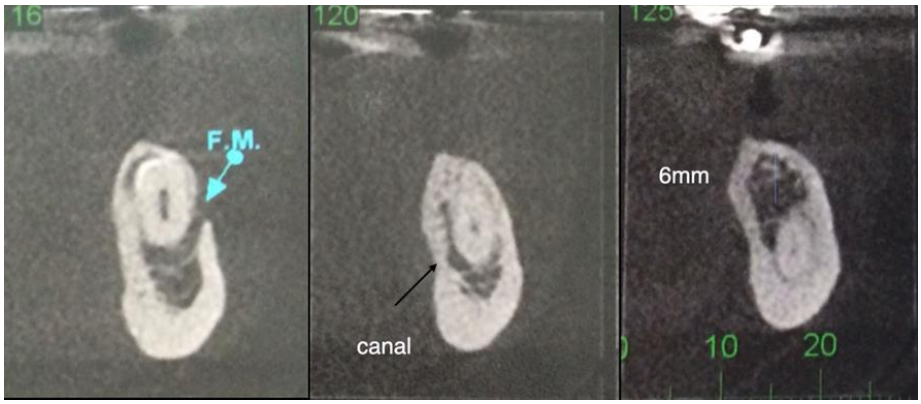


Figure 2: Cone beam computed tomography showing the proximity of the mandibular canal to the root apex of the impacted premolar.

The implant was installed with local anesthesia in the region of tooth 35 and after 60 days a metal-clay prosthesis was installed encompassing tooth 35 over the implant and a cantilever replacing tooth 34. The teeth were placed in conventional occlusion.

In the 3-year control, it was possible to observe the maintenance of the bone level of the peri-implant tissue and the integrity of the tooth that remains included. No prosthetic complications were encountered during this period (figure 3).

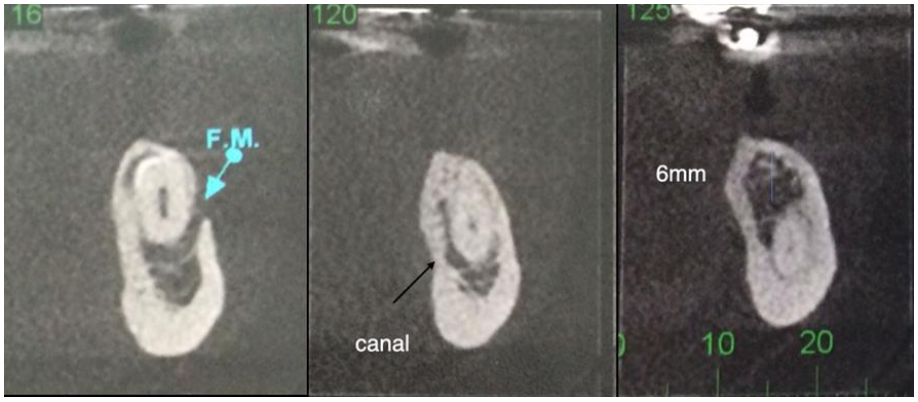


Figure 3: Periapical radiograph after the period of implant osseointegration and prosthetic rehabilitation.

Case 2: A 42-year-old patient sought rehabilitation of the bilateral posterior mandibular region. In the imaging exams, impacted premolars were observed on both sides (figure 4). In the detailed tomography exams, it was observed that despite the close relationship between the inferior alveolar nerve and the impacted teeth, in both cases the crown presented a safe distance about the nerve (figure 5).

The option, in this case, was for a coronoidectomy on the impacted teeth through vestibular access and odontosection, followed by filling with

inorganic bovine bone (Bio-oss) and covering with a slow-resorption collagen membrane (Bio-Gide) (figures 6 and 7). After 6 months 2 implants were installed on each side. Two implants showed intimate contact with the impacted teeth. After 60 days the patient was rehabilitated with metal-ceramic prostheses with splinted implants.

After two years of work, the imaging exam showed normality in both the peri-implant bone and the impacted teeth. Clinically, no complications were found (figure 8).

Figure 4: Periapical radiograph after the period of implant osseointegration and prosthetic rehabilitation.

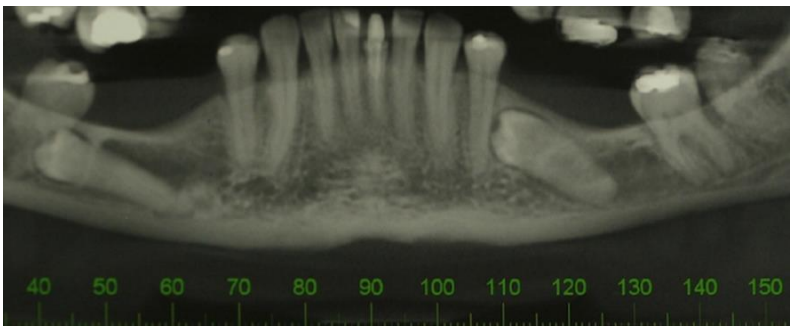


Figure 5: cone beam computed tomography showing an impacted premolars in an edentulous area (third and fourth quadrant).

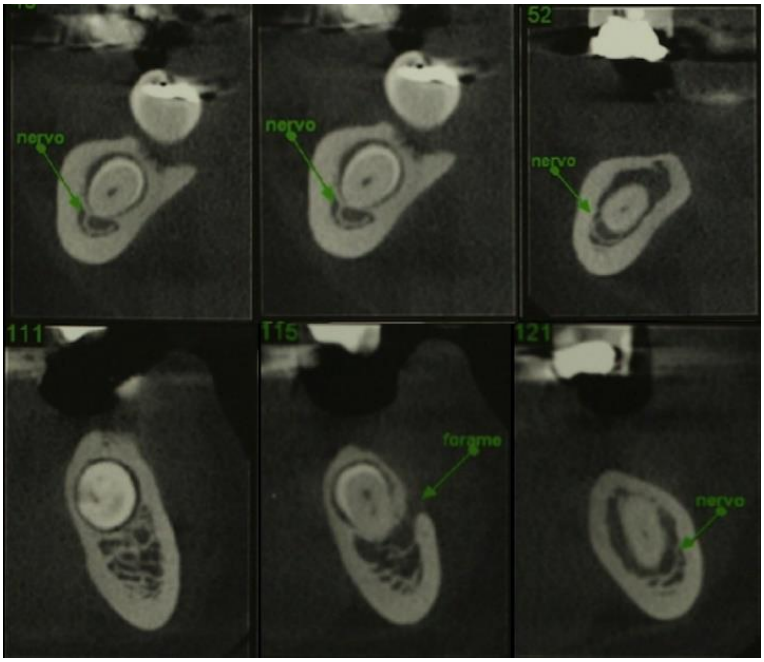
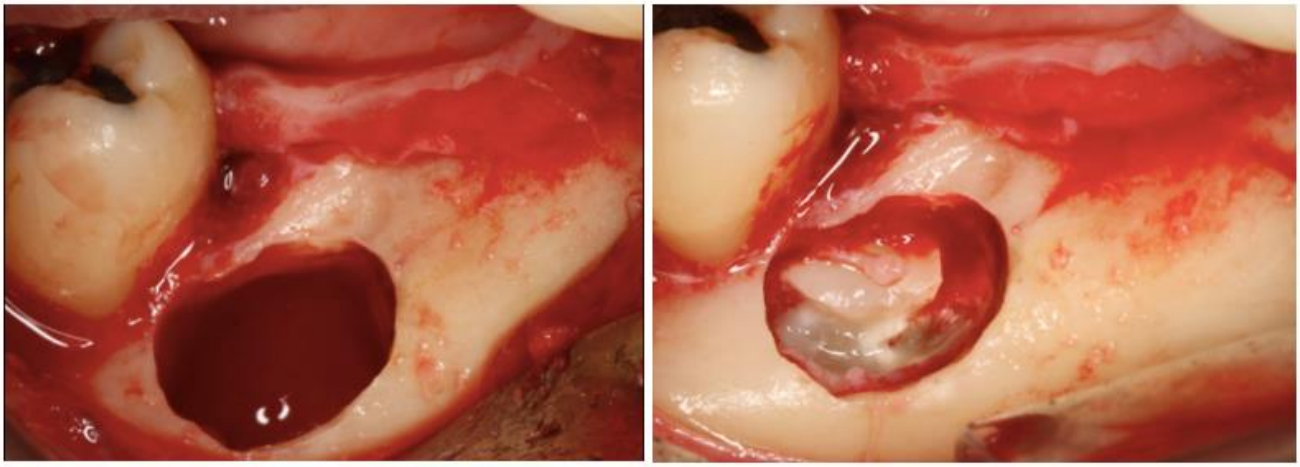


Figure 6: cone beam computed tomography showing proximity of the inferior alveolar nerve to the crowns of the impacted premolars.



Figures 7 and 8: Transoperative images of coronoidectomy.

Case 3: A 61-year-old patient missing teeth 34, 35, 36, and 37 in the mouth. Sought rehabilitative treatment with immediate implants. In the imaging exam, it was observed that one of the premolars missing in the mouth was included in the region of teeth 34 and 35 (figure 9). A close relationship between the root part and the inferior alveolar nerve was observed, but the coronal part was distant, even mesial to the mental foramen. The impacted tooth did not involve the region of teeth 36 and 37 (figures 9 and 10).

Under local anestesia, the crown was removed through a vestibular approach and odontosection. An implant was immediately installed transfixing the region where the crown was removed by locking in the bone apical to this location. The gap between the bone and the implant was filled with Bio-oss Collagen (figure 11). Two implants were installed in the positions corresponding to the lower left molars.

After 6 months, the patient was rehabilitated with a metaloplastic prosthesis on a temporary basis due to financial conditions. After two years of use, the same prosthesis continues to function without complications. The imaging examination of this control shows normality in both the remaining part of the impacted tooth and the implants (figure 12).

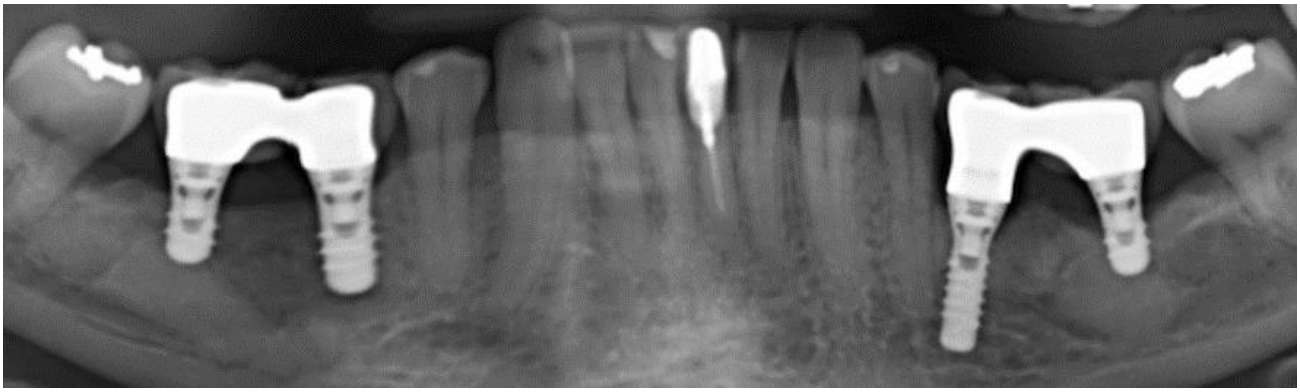


Figure 9: Panoramic radiograph section after the period of implant osseointegration and prosthetic rehabilitation.

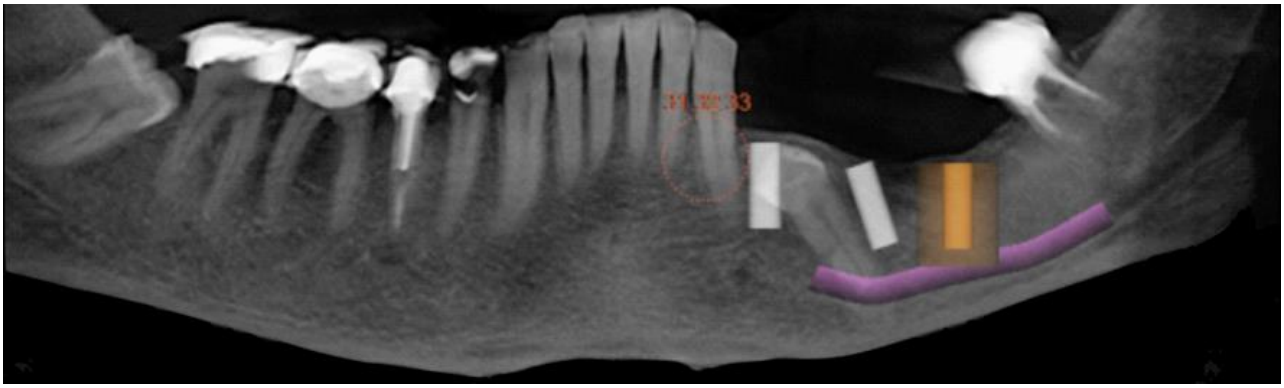
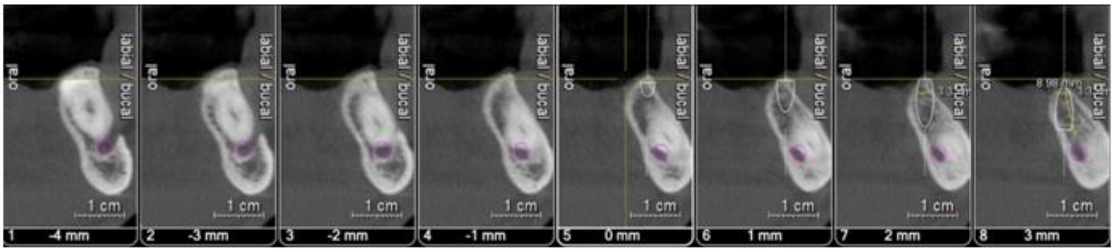
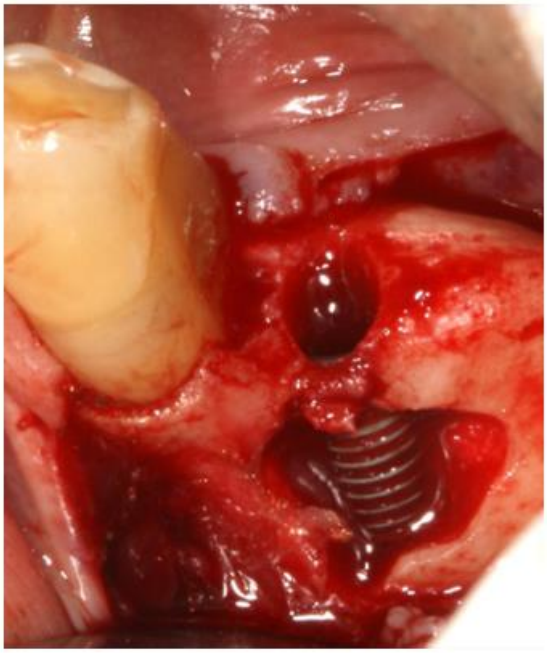


Figure 10: Cone beam computed tomography showing an impacted premolar in third quadrant.





Figures 11 and 12: Transoperative images of implant installation**.**

Case 4: a 38-year-old patient presented a class III maxillomandibular relationship with retention of multiple permanent and supernumerary impacted teeth. The teeth in the mouth were deciduous, supernumerary. Due to the number of impacted teeth and the size of the roots of the teeth in the mouth, orthodontics was contraindicated. Initial treatment was performed using Le Fort I osteotomy for maxillary advancement and bilateral sagittal osteotomy of the mandibular ramus for setback (figure 13). After 6 months under general anesthesia, the teeth in the mouth were removed, and 4 implants were installed in the maxilla and 4 in the mandible, respecting the remaining included teeth with the exception of the implant installed in the region of tooth 21 that transfixed the crown of the one that was included.

Two protocol-type prostheses in immediate loading were installed. In the 18-month control, prosthetic normality was observed and in the imaging examination, normality was observed in the 8 implants and the remaining impacted teeth (figure 14).

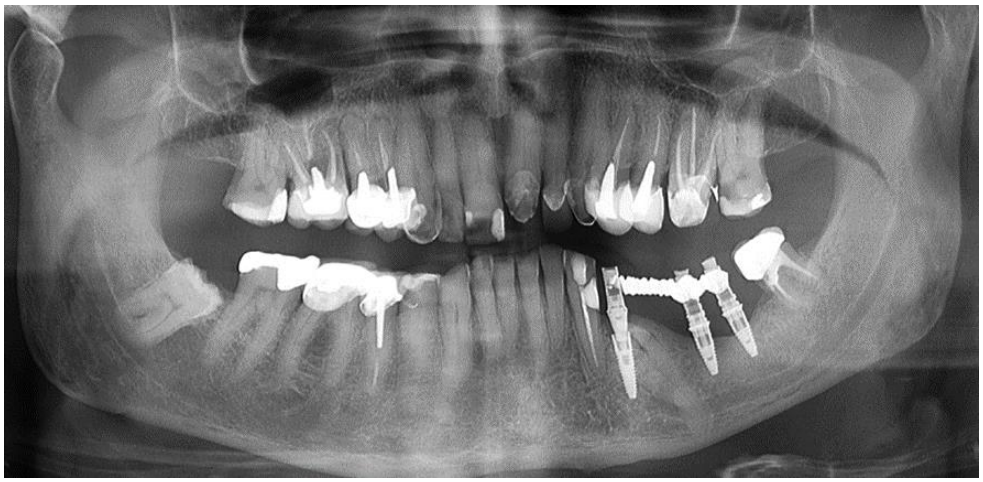


Figure 13: Panoramic radiograph after the period of implants osseointegration and prosthetic rehabilitation.

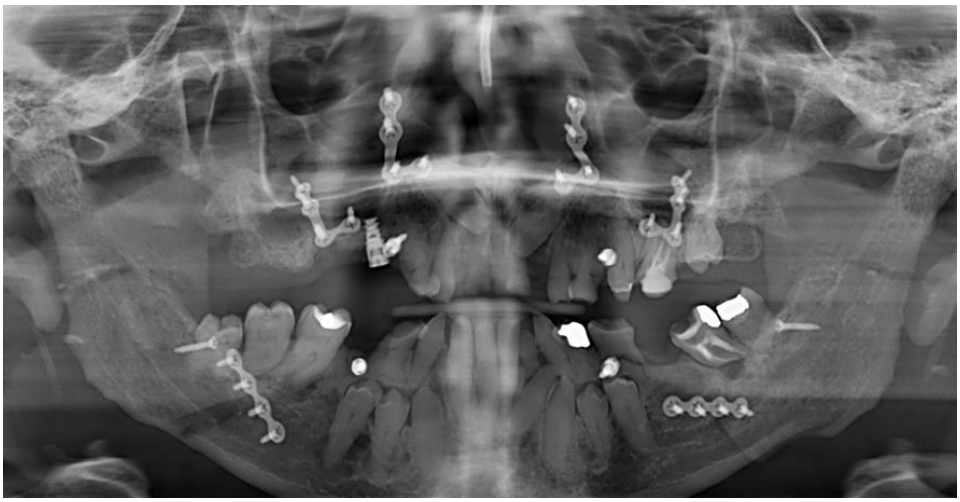


Figure 14: Panoramic radiograph after performing maxillary advancement and bilateral sagittal osteotomy of the mandibular ramus for setback.

Case 5: a 62-year-old patient with a complete denture sought treatment with osseointegrated implants seeking a fixed prosthesis. In the imaging exams, it was observed that the upper left canine was included in a vertical position, extending from the midline to approximately tooth 24 (figure 15).

Six implants were installed, with the most anterior fixation of the left maxilla being installed by milling the impacted tooth on purpose. After 90 days of osseointegration, the implants were reopened and a protocol-type prosthesis was made. After 18 months of function, no type of clinical or radiographic change was found about the implants or the impacted tooth, nor were any prosthetic complications found (figure 16).

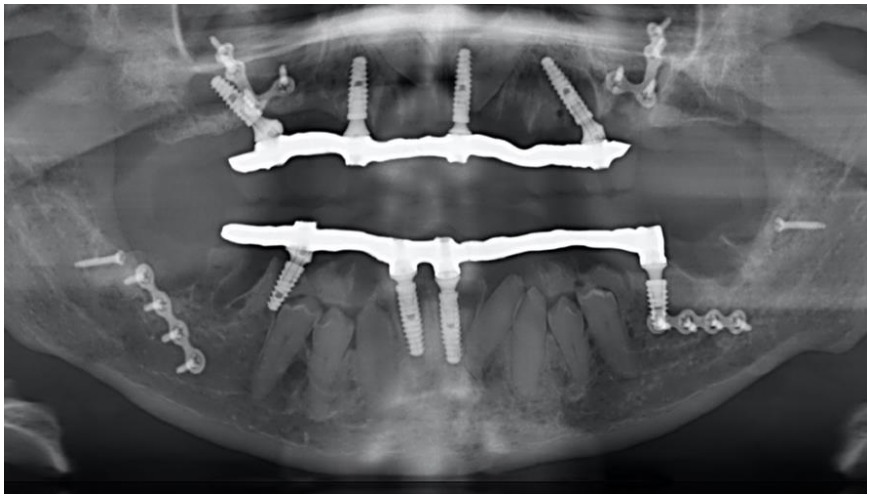


Figure 15: Panoramic radiograph after the period of implants osseointegration and prosthetic rehabilitation.

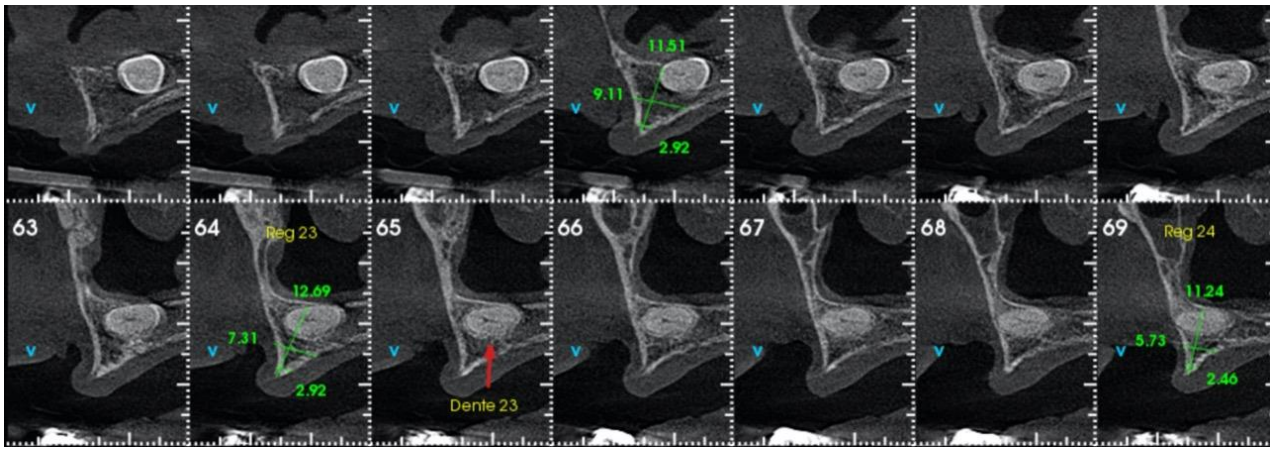


Figure 16: Cone beam computed tomography showing an upper left side included canine tooth.

Figure 17: Panoramic radiograph after the period of implants osseointegration and prosthetic rehabilitation.

Discussion:

The discovery of impacted teeth in routine imaging exams is not a rare occurrence (1,2). These teeth often limit bone availability for rehabilitation through osseointegrated implants. The decision to remove teeth or orthodontically traction them should be considered (3, 4, 6). To indicate this procedure, some factors must be considered, taking into account the risk-benefit ratio (3, 7, 8). Failed removal or failed traction of an impacted tooth can pose major complications to the patient (2, 4, 9).

Despite the lack of literature, articles validate the maintenance of roots of impacted teeth associated with dental implants (10, 11). Partial tooth removal (coronoidectomy) is an option supported by the literature, especially in impacted 3rd molars with close contact with the inferior alveolar nerve (13). The use of dentin tissue for bone reconstructions provides support for direct contact between the implant and the root of these impacted teeth without causing damage to either (13, 14).

In all of the cases presented by us, the removal of impacted teeth would result in large-scale bone defects and, in the mandibular cases, it would also result in large-scale damage to the inferior alveolar nerve, with the risk of being permanent.

Only in the first case was a non-conventional implant treatment used, where a single implant with a mesial cantilever was used. The use of this technique was described with larger implants (15), which was impossible in this case, which is why treatment with a single implant was chosen. Another factor considered is that in the event of implant failure, the after-effects were very small, making it possible to still carry out the other alternatives available for the case.

In none of the cases were complications observed for either implants or impacted teeth, supporting the maintenance of impacted teeth even with close contact or transfixation by the osseointegrated implant.

Conclusion

Although there are few cases, this article is in line with what the two systematic review articles observed, that there is still little literature and presentation of these cases with a long period of control.

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