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Aspects to Consider in the Replacement of a Tooth by means of Implant Placement during Orthodontic Treatment

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Abstract

Introduction: Nowadays, the use of orthodontics at any age, from adolescents to adults, has become a treatment of choice to correct malocclusions; Therefore, it is feasible to use it in the opening of spaces and their maintenance to later place a dental implant and thus replace a lost tooth.

However, it is not known the ideal moment during orthodontic treatment in which the specialist can place the dental implant, leaving it in osseointegration so that it can later be rehabilitated; and it is often placed after the treatment is finished; so it takes time for the patient to see results from the initial treatment that was intended; which is the replacement of the missing tooth.

Objective: Choose the time of implant placement during orthodontic treatment, seeking to shorten times and thus benefit the patient.

Method: A 20-year-old male patient is presented for evaluation for loss of space after an extraction of a lower first molar performed 2 years ago, he reported that it was extracted after a root canal treatment. Come in during your orthodontic treatment.

Result: The dental implant was placed during orthodontic treatment; shortening work times, for the benefit of the patient, since at the end of his orthodontic treatment he left with a rehabilitated implant.

Conclusion: The implant or implants necessary for the patient during orthodontic treatment can be placed and thus advance while they are osseointegrated, to later rehabilitate and finish both treatments at the same time; as long as you have the necessary spaces.

Keywords: orthodontics and implants; implants during orthodontics; osseointegration; tooth loss and spaces

Introduction

Dental implants are metal devices, mainly made of titanium alloys that are placed inside the bone, (osseointegrated) to achieve the correct retention, support and stability of a prosthesis; and with them seek to replace the already lost teeth [1].

Once the principle of osseointegration was included, treatment plans have changed over time. Thanks to this, nowadays implantology and orthodontics are related and can be considered as a complement to each other, taking into account the diversity of cases that occur in patients. (Gallego Arias, n.d.). The only thing that should be taken into account, according to Vanegas Juan et al. (2009), is that, whatever the technique used, the insertion procedure must follow a strict surgical protocol that protects the surrounding tissues and guarantees the stability and viability of the implant [2].

Nowadays, implantology has become more popular; However, the problems caused by early tooth loss is a problem that is experienced on a daily basis. Despite recent studies, many people are not treated with the most appropriate treatments for socket preservation; or they simply do not look for or can at that time replace the lost tooth with some alternative treatment, this has caused that in most cases there is a loss of spaces, modifying their occlusion and leading them to more serious problems that have had to be tried to be solved; Currently, orthodontics has been the best solution to these problems.

Implantology will require the help of orthodontics when it is necessary to place multiple implants, in order to evenly distribute them for their placement; or when corrections must be made in the height of the occlusal plane, such as in deep bites or open bites [2].

For this reason, the incorporation of orthodontics in the comprehensive planning of treatment with tooth replacement with Osseo integrated implants is a valuable complement that can improve aesthetic and functional results in restorative dentistry [4].

Reduced interocclusal spacing is one of the most frequent drawbacks to indicate orthodontics. Orthodontic treatment will offer us a safe result, making it possible to carry out a correct rehabilitation [1].

It is also common to find edentulous sites without sufficient mesio-distal space for implant placement; So it may take some space opening with orthodontics, to create it. The opening of the space Orthodontic bone has been associated with decreases in bone width at newly created sites. Comments [5].

Other points to consider are; the inclination of the roots of neighboring teeth, pathologies and anatomical structures such as the nostrils, incisor foramen and maxillary sinus, and these must be carefully evaluated during radiological diagnosis [2]. For this, three-dimensional imaging tests, such as cone beam computed tomography, allow a better understanding of the relationship between the roots and the vestibular bone, being an excellent tool to confirm the involvement of a tooth [6]. A further problem that may be present is previous periodontal disease, which leads to a deficiency of the horizontal rim [7].

The application of orthodontic strategies can be used as an adjunct in selected cases to increase bone volume for the future implant site and maintain space for the prosthetic parts of the implant [5]. A recent study quantified the benefits of “orthodontic extraction” and found that the efficacy of hard tissue regeneration is 70% and that of gingival augmentation is 60% [8].

As the eruption is a purely vertical movement, and occurs in such a way that the existing insertion around a tooth is placed under stress, it does not appear to be detrimental to the periodontal attachment apparatus if pathology is present. When a root erupts, even if there are cytotoxic regions on the root surface, because it is moving away from its enveloping junction, the periodontal ligament is not injured and will continue to impart stress to its bone structure, margins and result in deposition [8].

Currently, immediate-loading implants are very present; And these are the solution to aesthetic problems that occur especially in anterior areas and patients have the insecurity of being left without a dental organ. Sometimes bone resorption prior to orthodontic treatment, or tooth destruction, leads to tooth loss during treatment; And in these cases we can make use of post-extraction implants, they are placed immediately after having performed the extractions, these are inserted through the alveolus, and it must be considered

that at least a third of its surface is within firm bone, this condition will guarantee a correct primary stability of it [9].

Therefore, it is concluded that the *right moment is when it is certain that the space destined for the implant is the definitive one*. When the teeth are moved orthodontically, the spacing can vary, so you must be sure that this space is the final one for the final location of the implant. The orthodontist should choose the right time and consider that the length of the edentulous space will no longer vary, then, at this point already.

The implant can be placed, it is important to emphasize that it is not necessary to wait for the completion of orthodontics. Comments [10].

Objective

Choose the time of implant placement during orthodontic treatment, seeking to shorten times and thus benefit the patient.

Presentation of the clinical case

A 20-year-old male patient was presented for evaluation for loss of space after an extraction of a lower first molar performed 2 years ago, he reported that it was extracted after a root canal treatment. Assists during your orthodontic treatment. He has no hereditary family history of pathology or systemic diseases. He did not report having allergies or taking medications. He is a smoker and social drinker. Apparently healthy on physical examination.

The patient underwent orthodontic treatment in order to correct gyroversions present in anterior teeth; and to recover the mesiodistal space for the future placement of the dental implant in the tooth area 46.

The treatment was carried out with conventional metal brackets, starting with an alignment stage, followed by the distalization of tooth 47 and verticalization of this molar; Once stable with a square arch, planning for the placement of the implant began.

Extraoral (Fig. 1) and intraoral (Fig. 2) photographs were taken for the analysis and diagnosis of how the case would be handled; The arch was removed for a better view of the spaces. An X-ray series was started (Fig. 3).

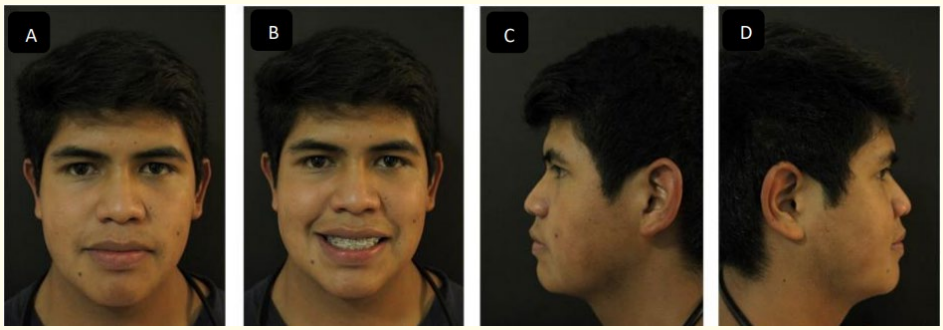

Figure 1: Extraoral photographs. Front (A), Smiling Front (B), Left Side (C), Right Side (D).

Subsequently, an analogous surgical guide was made with acetate and a metal guide tube (Fig. 4). It was tested on the patient and x-ray was taken to check the direction of the guide tube, corrected until the position was correct. An analogous guideline was chosen because, in intraoral scanning, metal causes “noise”.

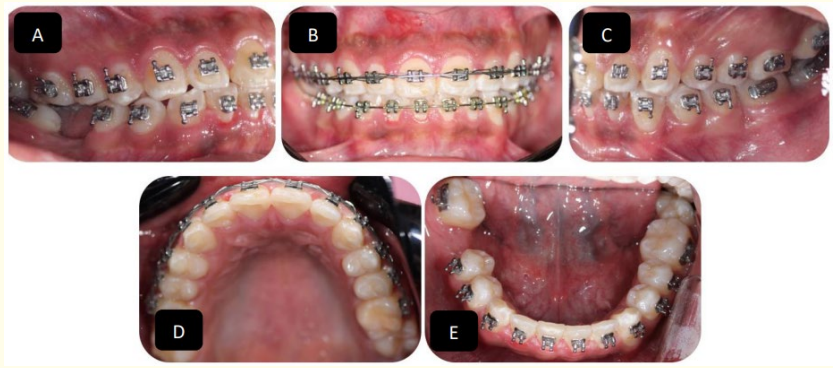

Figure 2: Intraoral photographs. right lateral (A), frontal (B), left lateral (C), superior occlusal (D), inferior occlusal (E).

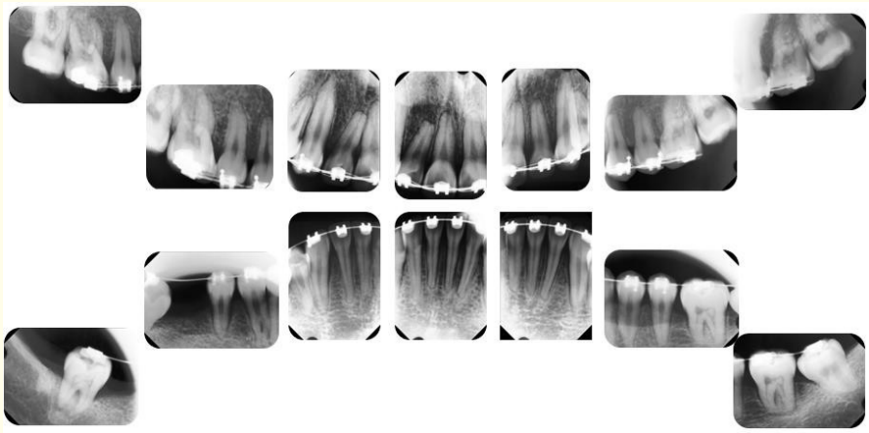

Figure 3: Radiographic series taken with radiovisograph. The edentulous area is observed.

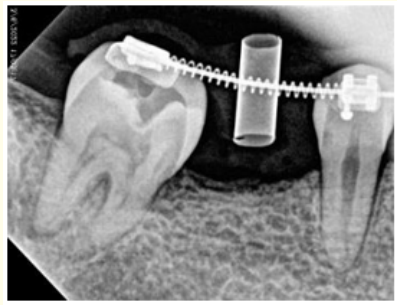

Figure 4: Analog surgical guide test x-ray.

Planning

A tomographic mapping of the area of the tooth to be replaced was done in a middle area; taking 3 measurements, superficial, middle and lower part of the alveolar ridge. The following measurements were obtained: superficial 443 Hu, medium 302 Hu and low 135 Hu (fig. 5).

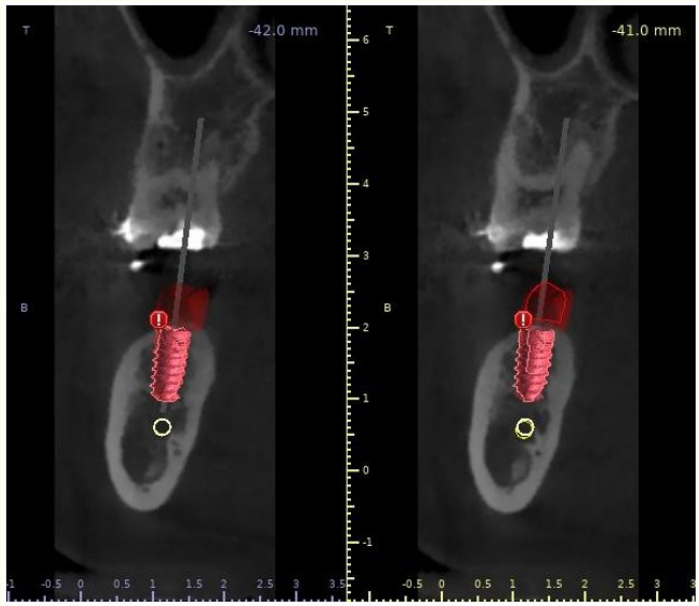

Figure 5: Choice and simulation of implant and crown placement. Selected implant marks Mis 5.0mm x 10mm.

The width and length of the alveolar ridge of the edentulous area and the bony ridge were measured in the space of the alveolar nerve duct, we obtained a measurement of 13.46 mm and in the lingual vestibule direction 9.08 mm; Therefore, it was chosen to place an implant of 5mm diameter by 10mm long, having the required space between implant and tooth. An implant from the MIS® commercial house of the Seven ® category would be placed.

Surgical

The patient was anesthetized in the right lower mandibular region with lidocaine with 2% epinephrine; The technique was reinforced with anesthesia in the long buccal nerve. A supracrestal incision was made in the area of the ridge of tooth 46, with a scalpel blade of no. 15. A full-thickness flap was lifted, both vestibular and lingual without liberators with Molt's legra.

Marking of the location of the next implant to be placed with a spear drill was initiated, using the analogous surgical guide. Milling was continued with a 3.0 mm diameter x 10 mm long cutter; and a parallelism X-ray was taken with the corresponding pin, where we verified the correct angulation of the milling (Fig. 6).

Figure 6: Formation of the bed for the implant.

The protocol was followed until the final drill that came in the implant package with a diameter of 5 mm by 10 mm long, with which the final bed for the implant was formed. The entire protocol was carried out at 800 rpm and 35 N (fig. 7).

Figure 7: Implant placement.

The implant was lowered with a surgical motor at 30 rpm and 30 N; It was decided to place a healing screw to shape the profile of the adjacent soft tissues. Soft tissues were tackled without covering the screw; carrying out simple stitches and placing Periacryl ® to achieve better hemostasis of the area (Fig. 8).

The patient was prescribed:

- Amoxicillin capsules 500 mg take one every 8 h for 5 days.
- Ibuprofen capsules 600 mg, take one every 6 h for 3 days.
- Paracetamol tablets 500 mg, take about every 6 h for 3 days.

Figure 8: Placement of the scar screw, for soft tissue shaping.

Results

Post-surgical: The patient was checked 15 days after surgery to observe the soft tissue and perform the removal of stitches. Clinically, we were able to observe a good healing of the soft tissues, around the healing tonnel and the area that was worked. Also, a control periapical x-ray was taken in which the bone and the implant can be observed: with good acceptance by the peri-implant tissue.

The review after 15 days showed a good evolution; The implant looked in good position, the adjacent soft tissue was well healed around the healing screw and the patient had no discomfort, a good postoperative period was achieved.

The patient continued with his normal orthodontic treatment; After three months, the equipment was removed and the patient was scheduled to see the progress.

Three months after implant placement, a periapical x-ray was taken to see the progress of the implant; which was as expected, obtaining adjacent bone and the conformation of soft tissue around the healing screw. So it was possible to take an impression for the next rehabilitation. A crown was planned to be placed over an e-Max coated zirconium core implant. Final photographs of the rehabilitation were taken (fig. 9).

Figure 9: Photographs of the patient taken after implant rehabilitation tooth area 46 (A) olcusal intake (B) frontal intake (C) lateral bite intake.

Discussion

There is a lot of discussion about the correct time to place dental implants that will replace a tooth while the patient is undergoing orthodontic treatment. Some articles mention that it is best to wait until the end of the orthodontic treatment, to know the final position of the other teeth and already with this plan the location of the next rehabilitation with a dental implant; However, others mention that even with good case planning, they can be placed prior to the placement of orthodontic appliances, and that once integrated, they can serve as a excellent anchoring medium to carry out certain movements more quickly; taking advantage of this osseointegration as beneficial [2].

According to Ornar José Pan Yana C. *The right time is when you are sure that the space destined for the implant is the definitive one*. When we are moving the teeth orthodontically, the space can vary, so we must be sure that this space is the definitive one for the final location of the implant. The orthodontist should choose the right time and consider that the length of the edentulous space will no longer vary, so at this point the implant can be placed, it is important to emphasize that it *is not necessary to wait for the completion of orthodontics* [10].

Conclusions

It is possible to place the necessary implants for the patient during orthodontic treatment; With this, it is possible to advance in the process of osseointegration of these, and at the same time continue with orthodontics; to later rehabilitate and finish both treatments at the same time.

It can even be beneficial to place them, if possible, you can rely on them as a fixed anchor for the same orthodontic treatment, as they have been studied as an excellent orthodontic anchorage.

With this, by carrying out the treatment in a multidisciplinary way, improvements are achieved for patients in terms of results and times; because treatment will be carried out from the points of view of different specialists, and results and rehabilitation will be achieved in less time; which will be much more beneficial for the patient if they are aesthetic areas, or in general.

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