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Immediate Implants in a Esthetic Area: Case Report

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Abstract: ***The immediate dental implant is a treatment whose purpose is to preserve bone structure and gingival tissue, in addition to reducing working time. This treatment has an excellent prognosis for maintaining gingival margins, effectively achieving the expected results. Thus, this work aimed to highlight the importance of immediate rehabilitation in the aesthetic area, with the presentation of a case report. A 19-year-old female patient (F.B.C) who had agenesis of elements 12 and 22. Guided implants 12 and 22 were performed, followed by xenogenous bone graft (Bio-Oss) covered by membrane (Bio-Gide), to correct the alveolar border of the region. In a second step, an increase in crown and osteotomy was performed on element 14 to make the canine gingival zenith more evident, since this, due to an ectopic eruption, was in position 13 even after final orthodontic treatment. It was obtained, within the proposed planning, a great aesthetic result and still, it was possible to return the harmony of the smile, combining aesthetics and function, leading to full satisfaction on the part of the patient.***

Keywords: Aesthetic implant, agenesis, bone graft

1. Introduction

Over the years, tooth loss from caries, periodontal disease or even dento-alveolar trauma is common in the general population. Other factors that we also need to consider are agenesias, dental malformations and anomalies. Among them, we often observe tooth transposition. This is considered a sub division of the ectopic eruption and is associated with other dental anomalies in the same patient, such as agenesis, conoid teeth, severe gyroversions, retained primary teeth and lacerations (Capelozza, et al., 2007). The types of interventions and solutions to these problems have also changed over time, especially due to the increase in technology, information and professional qualification. With the evolution of technology, a great diversity of prosthetic solutions for dental implants was created, bringing professionals and patients a wide range of options of procedures, equipment and techniques, allowing simplified prosthetic solutions for complex clinical situations (Dinato; Nunes, 2007).

According to (Abreu 2009), the main advantages of using implants over conventional fixed prostheses are avoiding the preparation of dental tissue from teeth adjacent to the prosthetic space, ease of cleaning and, when there is a need for repair or replacement is easier compared to conventional fixed prostheses.

When carrying out an implant after tooth extraction, it appears that the installation technique to be chosen must provide for the need for faster results and that meet the high level of aesthetic requirements of the patient today. As for current dentistry, the immediate implant with immediate loading represents a huge technological advance (Pereira; Sant'ana, 2018).

To carry out this type of treatment, we need to define some criteria, such as bone quality, occlusion, parafunctional habits and systemic condition of the patient, in addition to considering the remodeling of peri-implant tissues using tissue grafting techniques. conjunctive, preserving in this sense the volume of tissues (Thomé, 2019).

According to (Cho, 1998), osseointegrated implants can also be effective in areas with small defects in the alveolar ridge, where the amount of bone is sufficient to guarantee primary stability and osseointegration, however prosthetic rehabilitation can present compromised aesthetics.

There are several surgical techniques aimed at reconstructing the reabsorbed bone tissue: autogenous bone grafts, allogeneic, xenogenous and alloplastic bone substitutes, guided bone regeneration, osteogenic distraction, growth factors and combinations of these techniques (Bottino, 2006).

One of the challenges that are most encountered today in oral rehabilitation is the maintenance of the periodontal structure and supporting bone, for this reason techniques have been used for the immediate rehabilitation of missing teeth to obtain greater predictability and preservation in treatments with osteointegrable implants (Pereira; Sant'ana, 2018).

One of the alternatives to preserve bone-gingival architecture and the continuity of periodontal tissue integrity, are the less invasive techniques for extraction, with the immediate insertion of implants, plus immediate provisionalization (Mello; Coura, 2018).

Therefore, for (Sartori, 2005), it is important to make use of tools that enable an integrated planning prior to implant surgery and prosthetic rehabilitation, such as waxing up diagnosis, radiographs, computed tomography and making guides to be used in different stages of treatment.

With the correct diagnostic waxing and appropriate radiographic and / or tomographic examinations, the surgeon can study and determine with the team, the ideal position of

the implants in the desired areas, ensuring that the position of the implant does not compromise the prosthetic restoration (Arfai; Kiat , 2007).

The success for aesthetics in rehabilitation with dental implants is noticeable mainly in the anterior region of the maxilla, and, in this case, the patient does not expect only functional restorations, but satisfactory and long-lasting results from the aesthetic point of view (Nunes, et al. 2014).

Currently, zirconia has been increasingly used and researched as an important alternative for cases and prosthetic rehabilitation, especially in cases that require greater resistance associated with the aesthetic requirement (Ali, et al., 2014).

Thus, this work sought to highlight the importance of immediate rehabilitation in the aesthetic area, with the presentation of a case report integrating the results obtained, with results from other researched works, and finally, the availability of the data obtained to the other interested parties.

2. Case Report

A 19-year-old female patient (F. B. C) arrived at the clinic for dental implants. She had completed her orthodontic treatment 4 months ago and had a satisfactory systemic condition. In clinical and tomographic examinations, agenesis of elements 12 and 22 was observed. Due to an ectopic eruption, the premolar and canine (14 and 13) were also transposed, that is, with their positions inverted in the dental arch, even after orthodontic treatment completed..

Careful planning of the case was carried out by computed tomography analysis, taking into account the aesthetics involved. It was decided, then, to perform tooth extraction 52 and perform immediate implants (Neodent 3.5x 13.0mm) at the 12 and 22 site with the help of a previously made surgical guide. After the installation of the implants, bone grafting was performed with bio material (Bio-oss), covered by a slow reabsorption membrane (Bio-Gide), in order to give greater volume to the alveolar ridge. The bisacrylic resin provisionals were installed immediately. After 60 days, it was decided to perform a crown augmentation with element 14 osteotomy, in order to regularize the gingival zenith, thus making it more canine-like. In order to obtain a better aesthetics, a tooth whitening was performed and then, finishing the case, the ceramic crowns were installed with a zirconia base.

Therefore, based on the theoretical framework presented so far, the results of the clinical case study proposed in this article will be presented below.

Figure 1 shows the initial situation of the patient in question, with the initial presentation of element 52 with the addition of composite resin to close the diastema. In 62, a provisional stock tooth is observed, fixed by the palate with acrylic resin and orthodontic wire.

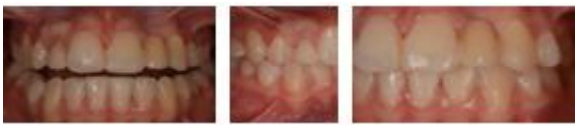

Figure 1: Initial situation, element 52 and provisional on 62

Subsequently, figure 2 shows two images of the CT scans performed for the respective intervention planning. It is observed that in the region of 12 we have a bone thickness in the most cervical portion of 5.59 mm and 3.98 mm in thickness in the region of 22. Thus showing a greater deficiency in the region of 22 and the need for bone graft in both regions, to improve the conformation of the alveolar ridge.

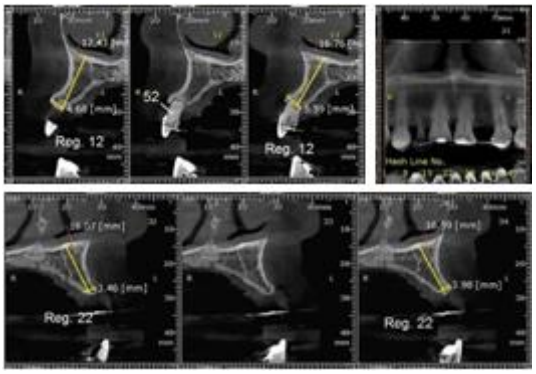

Figure 2: Initial tomographies

According to the planning carried out through clinical examination, tomography and previous waxing, the extraction of element 52 was performed cautiously. For this, a scalpel blade 15 (Advantive) was used, penetrating in the long axis direction of the tooth in question, breaking all the surrounding fibers and slowly dislocating it to preserve the region's gingival margins as much as possible. Then a forceps infant 01 (Millennium) was used to remove the element.

To assist in the position of insertion of the implants, a surgical guide was made. To make it, a previous impression was made with Hydrogum 5 alginate (Zhermack SpA® / Italy) to obtain the plaster model. A waxing was performed and the guide was made from colorless acrylic resin. Both the waxing and the surgical guide were performed in a prosthetic laboratory. With the guide in place, the implants were installed, both Morse Cone (Neodent 3.5x13.0mm) at the 12 and 22 location. They had a 45 N lock at the installation.

Figure 3: Extraction of 52 and the surgical guide positioned

After the implants were installed, an envelope incision and flap were performed in the region. This access, for bone graft in the vestibule of the 12 and 22. The height of the transmucosal of the universal sleeve was measured right after the installation of the implants through a millimeter probe. Then, the universal sleeves (Neodent), both of size 3.3x6x1.5 mm, were positioned. They were installed with 32

N each. With the trunnions properly positioned, the xenogenous bone graft started with Bio-Oss (granulation 1mm - 2mm / 0.5 g ~ 1.5cc), hydrated in 0.9% saline solution in a properly sterilized glass Dappen pot. This graft was taken and positioned in the cavities with the help of the concave part of a Molt Peeler number 09. After its placement, it was covered by a slow reabsorption membrane (Bio-Gide). It was hydrated in the same way as the graft and then taken to the site, completely covering the xenogenous bone of the edges. The graft together with the membrane were performed with the purpose of improving the compliance of the alveolar ridge.

Figure 4: Positioned implants, grafts and membranes

With the completion of the grafting process, the regions were sutured with 4.0 silk thread. Then, the making and installation of the temporary crowns started immediately. Bisacrylic resin color A2 (Structur SC Voco) was used to make the provisionals. This was previously made in a prosthetic laboratory, through a mock-up made with condensation silicone Zetaplus and Oranwash (Zhermack SpA® / Italy) from the waxing of the plaster model. These provisionals were captured in the provisional cylinder of the universal trunnion (3.3x6.0 mm Neodent) and repacked in the mouth with flow A2 resin (Opallis FGM) light-cured. After completing this step, a periapical radiography was performed.

Figure 5: Universal trunnion provisional cylinder positioned, bisacrylic resin provisionals and periapical radiography of the region.

As postoperative therapy, the use of antibiotics (cephalexin 500mg every 08 hours for 07 days) and anti-inflammatory (Ibuprofen 600 mg every 06 hours for 04 days) was prescribed, in addition to an ampoule of Injectable Diprospan, intramuscularly.

Postoperative follow-up and suture removal were performed 15 days after the surgical intervention, where the patient reported absence of pain and edema in the region.

After 45 days of surgery, the temporary crowns in bisacrylic resin were exchanged for crowns made of A2 color thermoactivated acrylic resin also made in a prosthetic laboratory.

After 60 days of the first surgery, the second planned surgical step was performed, the increase of the clinical crown in element 14. For this, the height of the clinical crown of the 23 was measured with a millimeter probe, taking as reference the distance from the border incisal to cervical. This distance was used as a reference for element 14 to be the same length as the clinical crown of 23. With the assessed measurement, removal of gingival tissue began, where it was necessary to remove 4.0 mm of the tissue. For the procedure, a scalpel blade number 15 (Advantive) was used, making an internal bevel incision in the cervical region, through the vestibular element 14. After removing the gingival tissue at the previously measured height, a Micro Ochsenbein chisel was used for osteotomy and regularization of bone margins in the region. Leaving the bone margin 3.0 mm from the end of the gingival margin, thus respecting the biological space. This procedure was performed to improve the gingival zenith of the 14, giving a condition of equity to the 23.

Figure 6: New acrylic provisionals and the 14 clinical crown increase

After 40 days of crown enlargement of 14, dental bleaching was done in the office. For this procedure, a Top Dam gingival barrier (FGM) was used to protect the gingival tissue. As a bleaching agent, 35% hydrogen peroxide (Whiteness HP FGM) activated with photopolymerizer was used. The treatment took place in 03 sessions of 50 minutes each. In each session, 03 applications of the bleach were made for 15 minutes each. After each application, abundant water washing was performed and after drying the region again, the application of the bleaching agent was performed again. The intervals between each session were 07 days each. At the end of it, a completely satisfactory coloring was observed, reaching the B1 shade of the Vitta scale.

Once the teeth were whitened, the final crowns were made, these were made using a zirconia-based ceramic system. For molding, a properly positioned trunnion transfer (3.3x6.0 mm Neodent), a closed tray and, as impression material, Zetaplus and Oranwash condensation silicone (Zhermack SpA® / Italy) were used. The molding was carried out in two steps, that is, at first the heavy material was molded and after taking setting, the light paste was added to give a totally faithful and uniform impression for the making of the crowns. After molding, the bite was recorded with pink wax 07 (Lysanda) preheated in a lamp. At the end of this step, the impression was immediately sent to the prosthetic laboratory to make the copings in ceramic without stratification. The provisionals were again cemented with calcium hydroxide liner cement (Dentsply) on a temporary basis.

Five days after molding, the copings test was performed. In this step, they were properly positioned to assess their adaptations. In the next step, the bite registration was performed with the use of Patern acrylic resin (Resin L S GC). For this, resin was added from the coping to the incisals of the neighboring elements (11, 14, 21 and 23) making a true bite JIG. The patient was asked to occlude, as soon as she took the prey, it was removed from the mouth

and sent back to the prosthetic laboratory. In that same session, the color was chosen using the Vitta scale and it was verified that the ideal color would be B1.

Figure 7: Color selection, coping proof

After seven days, the last session took place, where the work was delivered and finalized. For this purpose, the temporary crowns and the universal sleeves were cleaned to receive the new crowns. Due to its excellent characteristics and considering an extremely aesthetic region, the material chosen for making the definitive crowns was Yttrium-stabilized Polycrystalline Polycrystalline Zirconia (Y-TZP). With the crowns in position, new periapical radiographs were taken to assess their perfect adaptation. After radiographs, the guides and the occlusion with the aid of carbon (AccuFilm) were verified so that there was no occlusal interference during the edging movements. After the evaluations, the crown cementation process was started. They had previously been internally blasted with aluminum oxide in the prosthetic laboratory. Conditioning was performed with 10% porcelain hydrofluoric acid (Dentsply) for 20 seconds and afterwards, washed and dried well. As a bonding agent in the parts, silane (Ceramic Bond Voco) was used and they were cemented with dual resin cement (Relyx 3M). After cementation, the occlusion was again evaluated and final radiographs were taken.

Figure 8: Crown test and final X-ray.

Figure 9: Final result

Within the proposed planning, an excellent aesthetic result was obtained. It was possible to restore the harmony of the smile, combining aesthetics and function, leading to full satisfaction on the part of the patient.

3. Discussion

In the immediate installation, the results must be analyzed by the surgeon, who must be aware of the primary stability, together with the care during the installation of the implant, the surgical care with the tissues surrounding the fresh socket, in order to obtain a better prognosis for completion the case (Nunes, et al., 2014). Replacing incisor teeth through implants is a treatment that requires a lot of attention and planning (Mello; Coura, 2018). For this reason, careful clinical planning was carried out with the help of CT scans and previous waxing.

As for dental transposition, a possible explanation would be to consider the transposition as a result of the exchange of location between the germs of the developing teeth. The anomaly affects individuals of both genders and occurs in both arches, with a preference for the female gender and the maxilla. In addition, it is associated with other dental anomalies in the same patient, such as agenesis (Laptook; Silling, 1983). It was what we observed in our study, where the female patient presented with the 14 and the 13 transposed in the archway beyond the agenesis of the 12 and 22.

Some clinical situations end with an aesthetic problem, when the metallic abutment is visible to the soft tissues surrounding the implant, for example. This is a common problem when the implants are positioned very close to the bony crest and superficially to the alveolar bone and can also be a problem in a patient with a thinner gingival biotype or subsequent to the resorption of the bony crest around the implant (Foong, et al., 2013).

Currently the implants used are small in diameter in these areas, in contrast to what was done in the past, where implants with diameters the size of the socket generated after extraction were installed (Dinato; Nunes, 2007). To favor bone anchorage, the implant should be positioned slightly lingualized, if by chance a space is formed between the implant and the buccal wall, it must be filled, as the implants in the center of the alveolus or near the buccal wall can generate gingival recession (Silva, et al., 2017). In our case, in element 22 there was no element to extract. We found a flat bone, but with greater deficiency of the vestibular ridge. The 12, on the other hand, had the alveolus of the 52 that was extracted, but very narrow because it is deciduous and has rhizolysis. For this reason, it was not necessary to place an implant with a smaller diameter than the socket, because when the bone was pierced it was already enlarged more than the socket that was extremely narrow.

When installing immediate implants, filling is performed in the spaces between the buccal bone plate and the implant through the use of biomaterials with slow reabsorption, together with the evaluation of the gingival biotype, also considering the placement or not of a subepithelial conjunctive graft and the placement of the implant. All of the items mentioned above are fundamental and should be evaluated in cases of implants in aesthetic areas (Mello; Coura, 2018). Assessing the gingival biotype and bone deficiency at the site, we saw the need to use biomaterial (Bio-oss) and membrane (Bio-Gide) only to cover the vestibular alveolar ridge, since there were no spaces between the implants and the vestibular table of the alveolus 52.

In cases of immediate loading, the procedures for grafting soft tissue and biomaterial are indicated, in which the aesthetic factor is fundamental and there is a pre-existing structural deficiency. After implantation and provisional restoration, alveolar resorption of the buccal bone wall, horizontal and vertical, occurs, preventing eventual posterior aesthetic problem (Deon, 2010). With this in mind, a xenogenous bone graft covered by a membrane was performed. In element 22, where there was a greater

vestibular bone deficiency, it was observed that, even after performing the membrane graft, the region still had a bone dehiscence in the vestibular. As soon as observed, it was reported to the patient that she chose not to perform another surgical procedure. What made us reflect that we could have performed, in the same surgical step, the bone graft with a graft of connective tissue removed from the palate. So we would probably have an even better alveolar ridge covering.

The aesthetics of implant / supported prostheses and peri-implant tissues is always an issue to be addressed in the routine of the implantodontist clinician. In general, periodontal sequelae (loss of papillae / gingival recession) have a detrimental effect on the harmony and balance of dental aesthetics. In addition to replacing adjacent teeth in the aesthetic area, it is one of the greatest challenges faced by clinicians (Clavijo, et al., 2014). With the completion of the case presented, it was observed that the papillae and peri-implant gingival tissues were maintained properly.

The guides arose from the need to transfer information from prosthetic planning to the intraoral environment. Therefore, a well-made guide will assist the surgeon at the time of implant installation surgery, so as not to compromise the prosthesis result later (Becker, Kaiser, 2000). According to (Dinato et al., 2012), the use of the surgical guide allows the surgeon to predict the postoperative result. The indication of the surgical guide is greater in cases of edentulous arches with many implants to be installed and in cases where there is a need for implants in posterior regions. On the other hand, guided surgeries are indicated for the most diverse levels of rehabilitation with dental implants, from total cases to partial cases with or without extraction (Thomé, 2009). In the clinical case presented, where it was performed in a single aesthetic region with extraction, the use of the surgical guide was chosen, in view of the need for the correct position and maintenance of the gingival margins. This guide ensured the perfect installation position, taking into account the inclination and the bone edge. A primary stability of 45 N was observed, which guaranteed the possibility of placing the provisionals immediately.

In this way, the professional, upon knowing and mastering these characteristics, tends to obtain an optimization of the results, as well as the prosthetist, who must seek an accurate design and an excellent occlusal planning. (SILVA, et al., 2009). At work, we tried to make the provisional crowns properly adjusted, especially when capturing the provisional cylinder with flow resin. Taking due care with the conformation of the emergency profile and an adequate conditioning of the soft tissues.

According to a clinical study, survival rates for implants installed either immediately or late vary from 93 to 100% (Silva, et.al. 2017). Therefore, in general, it was found that for those situations of agenesis or tooth loss caused by resorption, root perforations and fractures, the best solution is the immediate implantation of unitary teeth in aesthetic areas. Thus, tooth extraction combined with the installation of the implant and crown has aesthetic advantages and also minimizes the treatment time, and the soft tissue healing happens together with osseointegration, favoring in this sense the stabilization of the gingival level.

Thus, in cases with esthetic prediction, to avoid loss of the surrounding bone, extraction should be performed with great care. For this, the most used instruments are: surgical mini-blades for intrasulcular incision, periotome, mini-levers, high-speed surgical drills, curettes, forceps for residual roots and for anterior crowns (Silva, et.al. 2017). Bearing this in mind, in the present study, a scalpel blade and straight forceps were used, slowly and carefully, for the more conservative extraction of the element 52.

Zirconia has been increasingly used and researched as an important alternative for cases and prosthetic rehabilitation. Its mechanical properties have characteristics similar to metals. The use of Polycrystalline Tetragonal Zirconia (Y-TZP) with the addition of Yttrium is a recent option for pure ceramic systems for aesthetic regions and posterior regions. The sum of its natural aesthetic capacity, its mechanical characteristics and its high biocompatibility result in systems that meet the current demands of patients, being indicated for use in fixed unit prostheses and fixed partial prostheses (Bachhav; Aras, 2011). Taking into account all the benefits and characteristics of this material, especially in the aesthetic region, it was the material of choice for making the crowns on the implants made in elements 12 and 22.

4. Conclusion

We conclude that the immediate installation of implants is a technique that provides a viable advantage for the patient, as long as this technique is well indicated, planned, and carefully executed, with its success rates so similar to those of conventional implants. Enables the preservation of the alveolar anatomy, maintains the height of the bone ridges, guides the angle of installation of the implants and reduces the number of interventions.

The results of this treatment were favorable both in the biological aspects of the peri-implant tissues, as well as in the aesthetic of the smile, leading to full patient satisfaction.

5. Conflicts of Interest

The authors declare that there are no conflicts of interest in relation to the publication of this article.

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