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Rehabilitative and multidisciplinary orthodontic, oral surgery and prosthetic treatment after dental trauma.

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Abstract

The great social and psychological impact caused by trauma to the anterior teeth obliges us to carry out an adequate rehabilitation. This often requires the coordination of different professionals with preferential training in different areas of dentistry, in order to optimize multidisciplinary treatment. This type of treatment is not feasible without a coordinated team in constant communication capable of making an adequate diagnosis, planning and monitoring of the case.
We present a patient who, after having suffered a trauma with avulsion of the upper left central incisor in childhood, came for consultation ten years later with the intention of aligning all his teeth and correcting the malocclusion caused by the avulsion. After evaluating different treatment options, due to the complexity of the case, we decided to approach it with a multidisciplinary treatment of orthodontics, surgery and prosthesis on implants. If the avulsion had been treated as soon as it occurred, the treatment would probably have been less lasting, complex and costly for the patient.

Introduction

Dental trauma is an injury that can occur to the teeth, bone and other supporting tissues as a result of physical impact. Dental trauma is one of the most common emergencies in our dental clinics. In fact, they are, after dental caries, the second cause of attention for pediatric dentists, as they generate pain, discomfort and sudden functional and esthetic alterations, as well as concern for their parents. They can be accompanied by soft tissue lesions, such as the lip, with hemorrhage and inflammation. They should be treated immediately and require long term controls since they can produce complications some time after the blow has been received.

The examination of the primary dentition of a patient after trauma is very important not only because of the presence of alterations in it, but also because it allows the identification of alterations in the future development of the permanent dentition.

The fundamental causes of these traumas are school accidents, sports activities and unfortunately in recent years, child abuse and gender violence. The prognosis of dental trauma depends on its physical characteristics, the area affected and the immediate attention of a dentist. When this treatment is delayed, major alterations can occur that hinder the subsequent diagnosis and treatment of the patient.

The teeth that suffer dental trauma most frequently are the upper incisors, followed by the upper lateral incisors and the lower central incisors.

Among the multiple problems presented by these traumas to children's front teeth, the psychological effect on both parents and the children themselves stands out, especially when they occur in the permanent teeth.

To obtain an adequate result in the treatment of dental trauma, a multidisciplinary approach is necessary in which planning is the consequence of the interaction of several professionals, who not only have a specialized dedication, but also a similar vision of the concept of functional and esthetic rehabilitation.

Anamnesis

We present a case of a patient who, in 2008, at the age of nine, suffered a trauma with avulsion of the upper left central incisor that was not treated immediately. The patient comes to our clinic ten years after the avulsion, in October 2018. He is now nineteen years old and the reason for his consultation is to assess the possibility of aligning all the teeth and correcting the malocclusion caused after the avulsion of the upper left central incisor.
In order to make an initial diagnosis of the case, we performed an orthopantomography (Figure 1) on the day we examined the patient at the first consultation.
We also performed an intraoral exploration and observed that after the avulsion of the upper left central incisor, the adjacent teeth had undergone a process of displacement, thus occupying their space. The patient presents a bilateral class II molar with overbite, maxillary compression and deviation of the upper midline to the left.
In order to make an adequate diagnosis and treatment plan, we consider orthodontic records to be fundamental, so we took intraoral photographs, radiographs (since we already had the orthopantomography, we only took a teleradiography) and study models (Figures 2, 3 and 4).

Figure 1. Initial orthopantomography of the patient.

Figure 2. Initial intraoral photographs

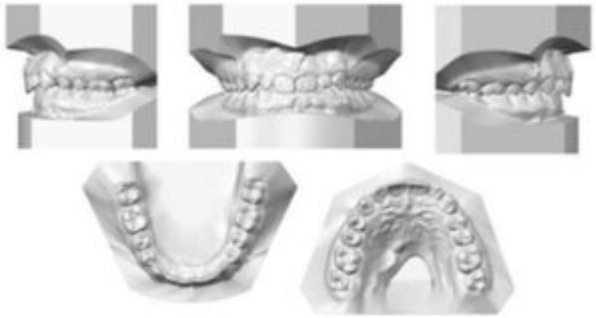

Figure 3. Study models

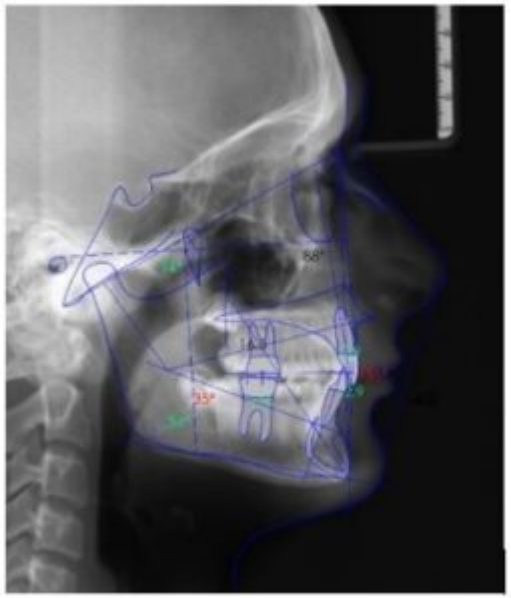

Figure 4. Teleradiography

Treatment plan

We planned to perform a combined multidisciplinary treatment between orthodontics, oral surgery and prosthetics. First of all, we had to perform orthodontic treatment in order to align the teeth, center the midlines and achieve a class I molar and canine. In addition, we had to open space at the level of the upper left central incisor in order to later place an implant with a crown.

Carrying out the treatment

Orthodontic treatment begins on October 26, 2018, and it is decided to place Damon Q self-ligating brackets (Figure 5).
After the placement of the brackets, the orthodontist checks the patient every two months for the first six months. At that time a radiographic control is made with an orthopantomography in which the need, or not, to recement any of the brackets is assessed with the aim of adequately parallelizing the roots and aligning the teeth (Figures 6 and 7).
Once the teeth and roots have been aligned and adequate space has been created to place the implant in the upper left central incisor, the orthodontist sets the objective of obtaining good intercuspidation to achieve a bilateral class I molar and canine. The orthodontist places a provisional resin tooth in the orthodontic arch (Figure 8) and starts the surgical treatment.
After verifying that the patient's bone growth has been completed with a hand-wrist radiograph, the surgeon requests a Cone Beam radiographic exploration of the patient (Figure 9) in order to be able to adequately plan the placement of the implant at the level of the upper left central incisor. In the Cone Beam we can see how the nasopalatine foramen is in the area where the implant should be placed.
In addition, intraorally we can see that the frenulum also occupies the center of the space where the crown will later be placed on the implant of the upper left central incisor (Figure 10).
After reading multiple bibliography about the placement of implants in the nasopalatine foramen, and verifying the advantages of this technique, we decided to perform it. It will also be necessary to perform an upper labial frenectomy.
On October 11, 2019, the surgery was performed. A crestal incision was made at the level of the left upper central incisor and extended intrasulcularly to the right upper central incisor and the left upper lateral incisor to avoid discharges in the anterosuperior front. Desperiostization of the area is performed, the nasopalatine foramen is located and the nasopalatine vasculonervous bundle is eliminated. Finally, the implant is placed in the nasopalatine foramen and a cover screw is placed over the implant to leave it submerged (Figure 11).
On the day of surgery, the orthodontic arch with the provisional tooth was left in place again. The appropriate revisions were

carried out for a period of time, both in orthodontics and surgery.
On March 12, 2020 the implant was already osseointegrated, so the second implant surgery was performed and a healing abutment was placed. That same day the upper labial frenectomy was performed. After all the surgeries performed, PerioKIN Hyaluronic 1% was applied to the patient in a gauze and he was instructed to apply it at home three times a day for two weeks. We always recommend this treatment after any surgical procedure since, among many other benefits, chlorhexidine favors the reduction of dental biofilm and hyaluronic acid visibly improves and tones the appearance of delicate gums and mucous membranes, providing an immediate sensation of comfort.
Due to the worldwide pandemic caused by covid-19, the patient's appointments were logically delayed, so that the prosthetic phase, which should have started after the implant surgery, had to be postponed for two months.
In May 2020, the prosthodontist performed an intraoral scan to place a temporary acrylic crown screwed onto the implant. The laboratory is asked to copy the anatomy of the upper right central incisor and to leave the emergence profile at the level of that same upper right central incisor, leaving a diastema distal to the upper left central incisor to close that space with orthodontics and to be able to finish the case properly. A bracket is cemented to the provisional crown screwed onto the implant, as the patient did not want the tooth to have a different appearance to the adjacent teeth (Figure 12).
Using a temporary crown screwed onto the implant, the prosthodontist formed a new gingival structure around the implant, and the orthodontist removed the brackets (Figure 13) leaving a fixed lower retention from canine to canine and a Hawley plate in the upper arch as night retention.
On December 28, 2020, after achieving adequate esthetics of the gingiva around the implant, we proceeded to make the final crown, obtaining a functional and esthetic result in accordance with what we had initially planned (Figure 14).

Figure 5. Intraoral photographs

Figure 6. Intraoral photographs

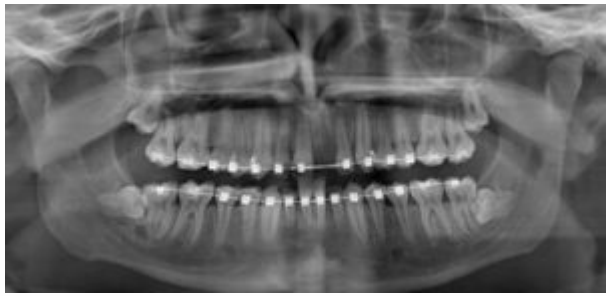

Figure 7. Control orthopantomography.

Figure 8. Placement of provisional tooth

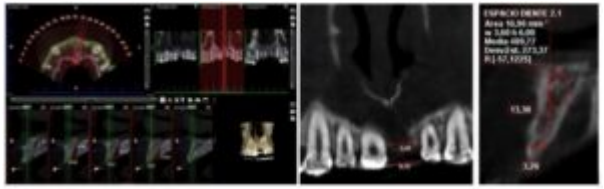

Figure 9. Cone Beam of the upper jaw

Figure 10. Intraoral photography

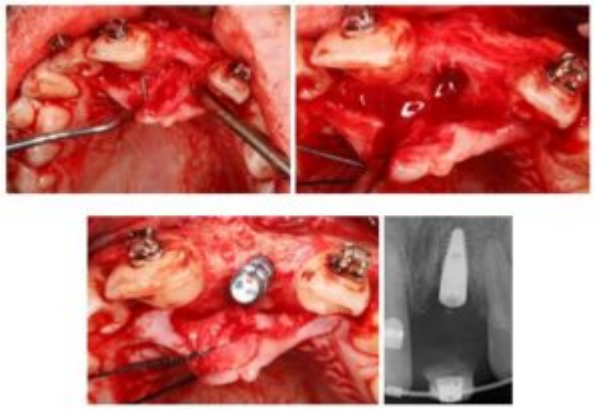

Figure 11. Intraoral photographs and periapical radiographs on the day of implant placement.

Figure 12. Intraoral photograph and periapical radiograph with the temporary screwed onto the implant.

Figure 13. Intraoral photographs after orthodontic removal.

Figure 14. Final photograph of the case

Follow up

This is the follow-up of the case one year after the end of treatment (Figures 15, 16).

Figure 15. Control orthopantomography one year after the end of treatment.

Figure 16. Control photograph one year after the end of treatment

Discussion

When a patient suffers dental trauma, it is very important that the first dentist to see the patient has the knowledge and equipment necessary to solve the problem and improve the prognosis of the treatment. When this is not the case, due to the appearance of certain unfavorable circumstances, the possibility of achieving predictable results in accordance with the esthetic needs of our patients is complicated.

A good multidisciplinary team is essential to be able to treat patients in the best possible way. This team must be coordinated and in constant communication in order to be able to carry out an adequate diagnosis, planning and follow-up of the case. Thanks to this, we have been able to solve the patient's initial problem, as well as the complications that have arisen throughout the treatment.

Although the diagnosis of a case is unique, there are multiple treatment options, but it will be the knowledge and skill of the professionals who will treat the patient that will determine the treatment that will ultimately be performed.

Conclusion

If a dental trauma is not treated immediately, problems appear that are difficult to solve during the course of treatment. Dental trauma can cause alterations at the esthetic, functional and psychological levels and, therefore, the treatment plan for a patient who has suffered dental trauma will always be individualized according to his or her needs.
Finally, it should be noted that the insertion of an osseointegrated implant in the nasopalatine foramen is a valid surgical option for our younger patients with practically no contraindications.

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