Immediate Dental Autotransplantation, an alternative treatment: A case report with a 2-years follow-up.

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Abstract

The objective of this case report was to describe the treatment sequence of an immediate dental autotransplantation, with the use of technology such as the elaboration of a 3D replica made on a computer in conjunction with cone beam computerized tomography and the use of an piezoelectric

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The objective of this case report was to describe the treatment sequence of an immediate dental autotransplantation, with the use of technology such as the elaboration of a 3D replica made on a computer in conjunction with cone beam computerized tomography and the use of an piezoelectric to reduce the work time, clinical and radiographic evaluations were carried out periodically, obtaining excellent results such as good biointegration of the tooth with hard and soft tissues, the aesthetic results were favorable. During the two-year follow-up there were no biological or mechanical complications. According to this study, immediate dental autotransplantation is an excellent treatment option.

Introduction

There are different treatment alternatives for the loss of a tooth, the most common being prosthetic solutions such as fixed prostheses, removable prostheses and implants,[1] the latter has an excellent survival rate of success, however the loading protocol influences the prognosis of immediate implant placement.[2]

The autotransplantation of tooth is a treatment that has been used for a long time and is a solution to the loss of a tooth, as long as there are favorable conditions for treatment, autotransplantation consists of the transfer of a tooth to another area of the same patient, usually the third molars are used,3,4 There are three types of approach related to autotransplantation; surgical extrusion, which is defined as the most coronal placement within the same socket, intentional reimplantation, which is defined as the extraction of a tooth to perform endodontic repair treatment and finally insert it into the same socket and the auto transplant itself.[5]

Clinical procedures for the treatment of dental auto transplantation have evolved, with the help of technology such as the use of tomography and the rapid creation of prototypes such as the replica of a donor tooth made in 3D printers, as well as the use of piezoelectric , reducing the time at the time of surgery and obtaining good control of the receptor bed, consequently reducing postoperative complications, improving the prognosis,6,7 however, there are still no established protocols for this reason, the dentist must know the disadvantages of auto transplantation related to the probing depth, ankylosis and root resorption.[5]

The objective of this case report is to describe an alternative treatment for tooth loss through dental autotransplantation, using a replica of the printed donor tooth made under three- dimensional technology with

a 2-year follow-up.

Case report

A 37-year-old female patient is referred to the endodontic area, for the evaluation of tooth 14, the medical history did not present any impediment for a endodontic or surgical treatment, the main reason for consultation was the mild pain that she presented during the last 6 months. The clinical examination revealed extensive destruction of the crown due to caries on tooth 14 (Figure 1), presenting pain on horizontal and vertical percussion, on periodontal examination she presented physiological mobility and absence of probing depth, on radiographic examination the deep carious lesion was observed below the cement-enamel junction, for this reason a prosthetic solution was not viable.

Two treatment options were proposed, the first the placement of a dental implant immediately after extraction and the second the extraction of tooth 14 and the auto transplant of tooth 35 after root canal treatment, since this tooth would be extracted for orthodontic reasons (Figure 2). The patient signed his informed consent knowing the advantages and disadvantages of the second treatment option.

Treatment begins with planning through the use of cone beam computerized tomography (CBCT), for the measurement and comparison of the area of the donor tooth (tooth 35) and the receptor bed (tooth 14), the distances of the surrounding anatomical landmarks were also analyzed. A three-dimensional replica of the polymethylmethacrylate (PMMA) donor tooth was made, in order to have a control during the preparation of the receptor bed.

The execution of the treatment begins with the endodontics of tooth 35, immediately afterwards anesthesia around tooth 14, to start the extraction and preparation of the receptor bed, for the preparation of the receptor bed was used the piezoelectric instrument (Woodpecker ultrasurgery, US-II, Guangxi, China), with abundant sterile saline. During the preparation of the receptor bed, the replica of the donor tooth was placed, until achieved the total introduction of the replica of the tooth (Figure 3), then the extraction of the donor tooth was performed, an apicoectomy and an apical retropreparation were performed due to the fact that the donor tooth presented a longer length, it was finally sealed with Biodentine (Septodont, Saint Maur des Fosses, France), the procedure described was carried out with the objective of minimizing the preparation of the recipient socket. Immediately after the total introduction of the donor tooth in the recipient bed, a radiographic evaluation was performed (Figure 4).

The transplanted tooth was splinted with composite resin to the teeth adjacent by buccal and palatal for 4 weeks (Figure 5), splinting was passive to maintain the physiological mobility of the tooth, wear of approximately 1mm was performed and it did not come into contact with the antagonist and during the dynamic evaluation of the occlusion did not present occlusal interferences. after the surgery, antibiotics were prescribed every 8 hours for 5 days, after 4 weeks the splinting was removed and a clinical and radiographic control was carried out, observing preservation of the soft tissues and the integration of the donor tooth and bone formation around (osteointegration), after 2 months a clinical and radiographic control is performed again, as well as a direct occlusal restoration.

The clinical and radiographic follow-up were at 2-months, 1-year and 2-years, during the second month of clinical control, the patient decided not to undergo orthodontic treatment. finally the last radiographic control was observed the good integration of the and bone crest formation (Figure 6), clinically preservation of the soft tissues was observed, it did not present when probing depth (Figure 7).

Discussion

This case report describes the treatment sequence of an immediate dental autotransplant in the event of an evicted tooth, there are different treatment alternatives and a prosthodontic treatment is not always viable, autotransplants have presented an excellent long-term success rate and even in autotransplanted teeth with incomplete root formation, the different studies show low values regarding complications such as abnormal mobility, ankylosis and root bone resorption, however these low values influence the prognosis.[1,8]

Another treatment with an excellent survival rate in partial edentulous patients is implants; however, depending on the placement and load of the implant, it influences the prognosis,[2] unlike autotransplantation, it is defined as a single block, that is, According to the different studies, it would have a similar classification: immediate autotransplantation, that is, in fresh post-extraction alveoli, and late auto-transplantation, that is, surgically created alveoli, both with immediate loading.

Several retrospective clinical studies have shown that third molars and premolars are donors for clinical practice, however transplanted premolars have a higher survival rate than transplanted third molars,3,9 these results are consistent with the case report, that during 2 years of follow-up, the transplanted premolar did not reveal any biological or mechanical complications.

Autotransplantation is not a common treatment in general dental practice, however it is an economically viable treatment alternative that is less invasive and complicated than a conventional prosthetic treatment.[4]

At present there is no consensus on dental autotransplantation, however there are multiple studies with high success rates and low complication rates, the different cases show different protocols, for this reason the clinical protocols are not yet defined,[5] all cases show long-term treatment, however there are few studies that perform a periodontal evaluation and there is insufficient documentation on the occlusal evaluation of autotransplanted teeth.

The elaboration of a 3D replica of the donor tooth, through the use of digital technology, facilitates the elaboration of the receptor bed, with work times of approximately two minutes, I feel a less invasive technique,[6] the use of piezoelectric also reduces the time during surgery and in some cases allows the protection and maintenance of the periodontal fibers of the transplanted tooth, which is necessary for long-term success.[7]

Conclusion

Dental autotransplantation is a viable treatment with a good prognosis and low cost, as long as the necessary tools for the treatment are used. Planning through CBCT is important to reduce complications before, during and after surgery. Occlusal evaluation and occlusal stability in transplanted teeth is crucial for prognosis in order to avoid fractures.

Conflicts of interest

The authors declare no conflicts of interest related to this study.

Author contribution Drs Henrry Cardenas-Sallhue and Kenyi Aronres-Huamancha contributed to the planning and execution of the treatment and the drafting and revision of the manuscript. All authors gave their final approval.

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