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Case Report

Autologous Biomaterials and Their Application in Post-Extraction Dental Implants in Areas of High Aesthetic Compromise. A Case Report.

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Abstract

The placement of post-extraction implants in the aesthetic zone has been a topic of great interest in the field of oral implantology, and even more so when the patient's teeth can be a source of autogenous bone graft and furthermore, if it is combined with Platelet Rich Fibrin membranes, accelerates the healing process, decreases pain and inflammation.

Keywords: Autologous; Dental Implants; Aesthetic; Extraction

Introduction

Dental implants can be placed in the socket immediately after tooth extraction. This offers some advantages, such as reducing the bone loss that occurs naturally when a tooth is lost, minimizing the number of interventions, shortening treatment time and increasing patient comfort, in addition to the results previously reported in the literature showing a high survival rate [11,12].

The use of dental pieces as an autogenous graft also becomes an alternative to preserve the residual alveolar ridge, immediately after extraction. Since the 1960s, dentin has been evaluated as a biomaterial to induce bone formation. Very promising results have been reported, proposing the use of dental pieces as a reliable, stable bone substitute, free of pathogenic germs due to the procedure used during its elaboration [2,5].

Dental pieces share the same embryological origin as alveolar bone, in addition to their physical properties, such as density and roughness, which could explain their capacity for bone formation; Likewise, dentin and bone have the same organic and inorganic percentages, type I collagen (90%), biopolymers, lactate, lipid, citrate and non-collagenous proteins. Type I collagen induces bone formation by stimulating the activity of osteogenic cells [1,3,4,6,7,9,10].

As a complement, the use of Platelet Rich Fibrin membranes, which consist of a network of fibrin, stem cells and second-generation platelet concentrates that regulate inflammation and angiogenesis, accelerates healing, regeneration of hard and soft tissues, in addition to potentially accelerating osseointegration through the release of growth factors [6,8,13].

Next, the following clinical case is presented using autogenous dentin and Platelet Rich Fibrin membranes, in a post-extraction dental implant placement situation.

Clinical Case

Female, 26 years old, referred from a private hospital in the city of Zacatecas, Mexico, the night before she suffered a vasovagal syncope, which caused facial trauma and dental fracture, the patient responded the initial questioning and did not have the record of drug or alcohol intake. The extraoral clinical examination revealed soft tissue injuries, and suture in the lower lip; Intraoral clinical

examination revealed complete permanent dentition, crown fracture of teeth 11, 21 and 22; maxilla without mobility, favorable oral opening (Figure 1,2).

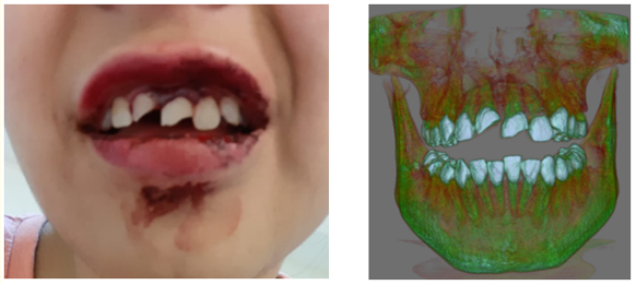

Figure 1: Inicial situation.

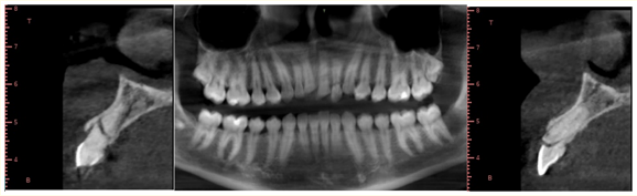

Figure 2: Tomographic diagnosis.

Due to the aesthetic and functional compromise, the patient is offered a multidisciplinary treatment and rehabilitation with osseointegrated dental implants, whit that she can recover her smile and self-esteem; The initial treatment included immediate splinting of the maxillary anterior area for three months, since it involved a dentoalveolar fracture up to the floor of the nose (Figure 3); then the surgical evaluation was performed according to the ITI consensus (Figure 4).

Figure 3: Inmediate splinting.

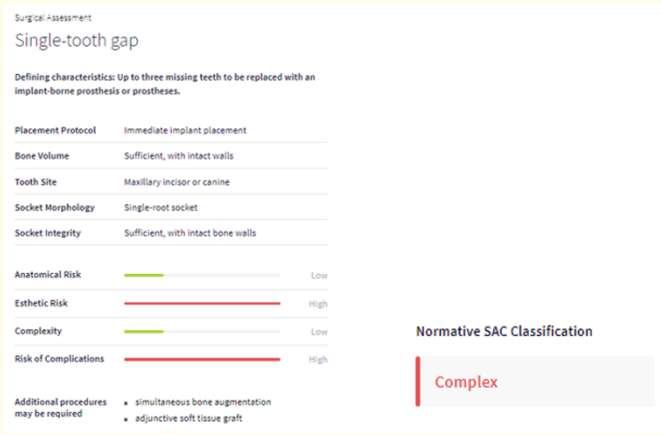

Figure 4: Risk assessment in implant dentistry ITI.

Surgical planning

Subcrestal implant placement 3.5mm x 13mm in zone 2.1 and 2.2 (Figure 5).

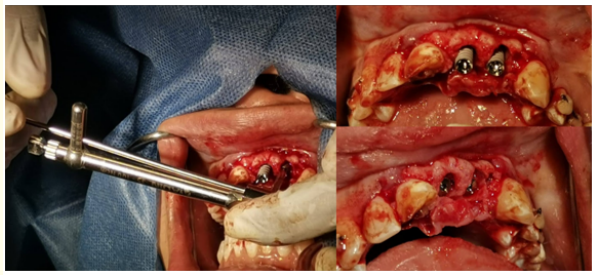

Figure 5: Immediate placement of dental implants into extraction sockets, Adin Touareg CloseFit RP 3.5mm x 13mm.

Preparation of autologous dentin graft for GAP filling using Kometabio, teeth 1.8, 2.8, root remains 2.1 and 2.2 were previously extracted (Figure 6,7).

Figure 6: Preparation of autologous dentin graft.

Figure 7: GAP filler.

Prosthetic planning

After waiting 4 months for osseointegration and under radiographic control (Figure 8), soft tissue management and provisionalization on dental implants began to conform the emergency profile (Figure 9-11) and thus perform digital smile design (Figure 12) and proceed to the final restoration, which consisted of e. max Monolithic Crown 1.2, IPS e. max Veneer 1.1, Custom Ceramic Abutment 2.1 and 2.2, e.mx Monolithic Crown 2.1 and 2.2 (Figure 13,14).

Figure 8: PRF membranes.

Figure 9: Radiographic control.

Figure 10: Emergency profiles.

Figure 11: Soft tissue management and provisionalization.

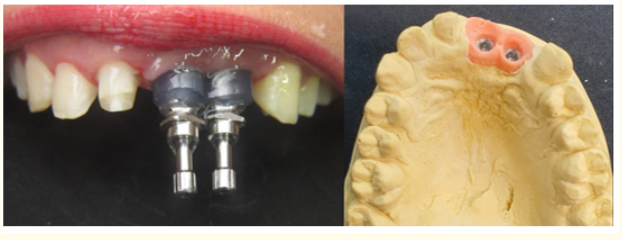

Figure 12: Emergency profiles.

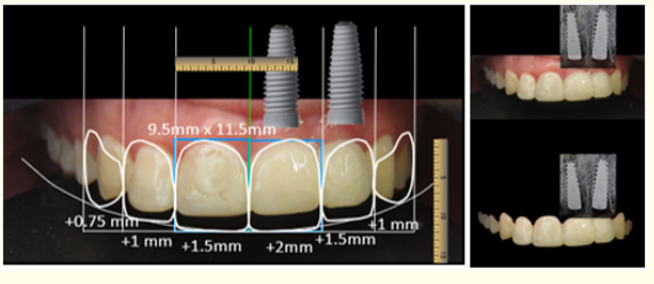

Figure 13: Digital smile design.

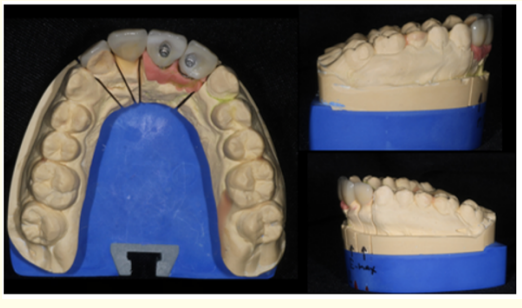

Figure 14: Final restorations.

Conclusions

It is of great benefit to use extracted teeth as autogenous grafting material, especially because of its efficient and simple processing. Autologous dentin graft acts as an excellent alternative as a bone substitute, in addition to being readily available, it also has the advantage of not causing reaction in the host tissue, which is an important safety aspect to consider when selecting a graft. Platelet aggregates provide an economical alternative to commercially available bioactive materials, with the advantage of being a simplified procedure, reducing postoperative pain and inflammation.

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