



Case report

APPLICATION OF A-PRF IN AN AREA WITH NON-INTEGRATED XENOGRAFT

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ABSTRACT:

Background: Xenografts are well-studied materials that are often used in regenerative dentistry. Nowadays the number of surgeries involving bovine derived xenografts in implant dentistry has increased significantly. However, the long-term success of these materials is still not well studied. A-PRF has been used as an autogenous product that can increase the predictability of the clinical procedure by introducing many platelets growth factors.

Purpose: to describe a difficult for diagnostic and treatment clinical case and to propose a clinical protocol for resolving similar complications that can occur after guided bone regeneration.

Materials and methods: 41 years old woman complains of pain, edema and inability to chew on the upper right quadrant after a history of placed dental implants and GBR procedure. A full thickness flap was reflected starting from tooth #11 to #16. A thorough decontamination of the affected area has been done with Piezoelectric instruments and A-PRF has been introduced to improve healing process. The flap was repositioned to its original position and sutured with single interrupted resorbable 6/0 sutures. Two weeks after the procedure of surgical removal of the xenograft the patient is relieved from all preoperative symptoms and complaints.

Results: The normal architecture of the residual bone and alveolar mucosa is restored. A new CBCT is taken to evaluate the new clinical situation.

Conclusion: The case demonstrates that the use of bone substitutes and especially xenografts should be done with caution because they are not resorbable and a potential infection around the graft particles may have long-term biological complications.

Keywords: xenograft, implant, bone regeneration, complication, A-PRF,

INTRODUCTION

The resorption of the alveolar bone is inevitable event after the extraction of the teeth and is most pronounced during the first three months after the extraction and continuous through the whole life. To overcome this clinical situation, when implant therapy has been planned, clinicians have to regenerate the atrophic jaw. In most of the cases the first choice of the dentist is to apply guided bone regeneration procedure with the use of collagen membrane and bone substitute to reconstruct the bone and to make implant installation possible. Bovine bone substitutes have been extensively used in peri-implant reconstruction, and alveolar bone augmentation and in many other cases like periodontal regeneration and socket preservation [1, 2]. Several studies [3, 4] have shown that bovine xenografts are biocompatible and osteoconductive, with extremely slow degradation rate, and therefore able to maintain the volume of the augmented site in the long term. In recent years the number of surgeries involving bovine derived xenografts in implant dentistry has been increasing significantly. Meanwhile, in the literature, there is a lack of data on the risks of their use.

The **PURPOSE** of the publication is to describe a difficult for diagnostic and treatment clinical case and to propose a clinical protocol for resolving similar complications that can occur after guided bone regeneration.

MATERIALS AND METHODS:

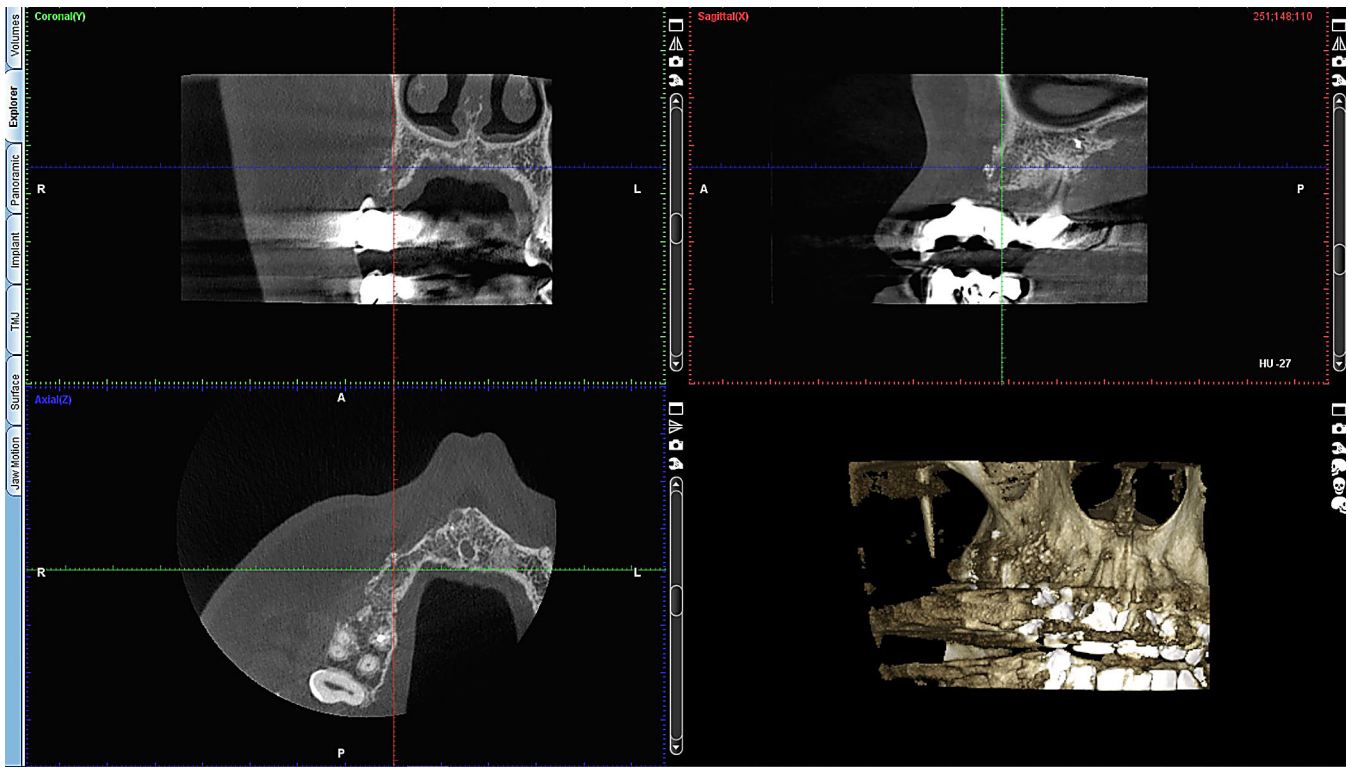
41 years old woman has been referred to the Department of Periodontology in the Faculty of Dental medicine – Sofia with complaints of pain, edema and inability to chew on the upper right quadrant. The patient didn't report any medical issues except for a history of placed dental implants in the upper right quadrant 10 years ago. The implants were explanted a week after their installation, but the pain and swelling in the area still persisted. Three years after the implants have been removed a sinus operation with lasers had been done, nevertheless, the release from the pain was temporary. After another consultation with a neurologist, the patient has been advised to take Neurotop 300 mg, twice a day, because of neuralgia of n. trigeminus. Simultaneously with this medication, the patient made several sessions of acupuncture for the duration of 7-8 months. The clinical symptoms have been resolved temporarily for a short period of time.

The partially edentulous area has been restored with a fixed temporary bridge on the neighbouring abutment

teeth #22, #21, #11, #16 and #17. In order to obtain healing in the edentulous area, a provisional PMA bridge has been fabricated in the area so that self-performed oral hygiene can be established.

The diagnosis has been developed on the anamnesis, the history of GBR during the dental implants' installation and the presence of radiolucency granules that can be clearly seen on the CBCT (Fig. 1).

Fig. 1. CBCT demonstrates the presence of radiolucency granules



The treatment plan consisted of reflection of a full thickness flap, decontamination of the underlying soft and hard tissue from the xenograft granules and repositioning of the flap in its original position. The patient signed informed consent.

Surgical procedure:

After local anesthesia with Ubistesin 4% with adrenaline 1:200 000, the temporary bridge has been removed (Fig. 2) and the abutments were gently cleaned with ultrasonic devices to reduce the bacteria. Then a full thickness flap was reflected (Fig. 3) starting with a crestal incision from the distal line angle of #11 through the edentulous area reaching the mesial line angle of #16 and intrasulcular incision of #16. No vertical releasing incisions were made. Apically the full thickness flap was extended above the mucogingival line in order to ensure access to all xenograft particles. A thorough decontamination of the affected area has been done with Piezoelectric instruments in order gently remove the non-integrated xenograft from the alveolar bone and to reduce the postoperative edema. Soft tissue scissors have been used to remove graft particles from the alveolar mucosa. Histology with incapsulated graft granules and granulation tissue around them has been taken from the affected site. After thorough rinsing with saline (Fig 4), A-PRF have been introduced in the area (Fig 5) to promote better soft-tissue healing. The flap was repositioned to its original position and sutured with single in-

errupted resorbable 6/0 sutures (Fig 6).

The histology examination demonstrated bone particles (Fig 7), bone trabeculae (Fig. 8) peri osseous fibrosis (Fig 9), hyperemic small blood vessels.

The patient was advised for proper plaque control using an ultra soft toothbrush and prescribed 0.12% chlorhexidine mouthwash for rinsing twice daily for 2 weeks (Fig. 10). The patient was put on regular recall every 3 months.

Fig. 2. Clinical situation at the day of surgery



Fig. 3. A full thickness flap



Fig. 4. Incapsulated graft granules and granulation tissue

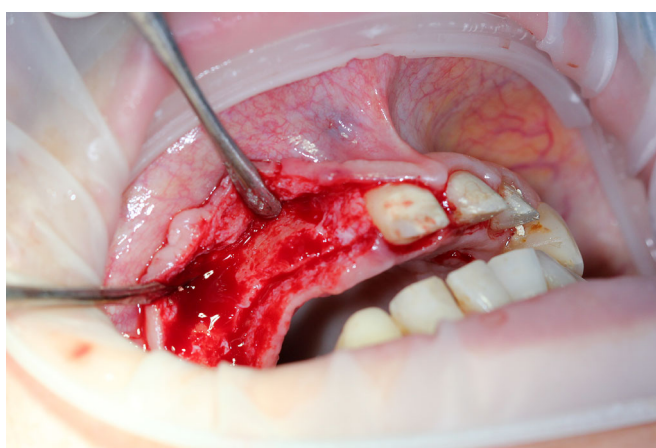


Fig. 5. Decontaminated surgical wound with A-PRF.

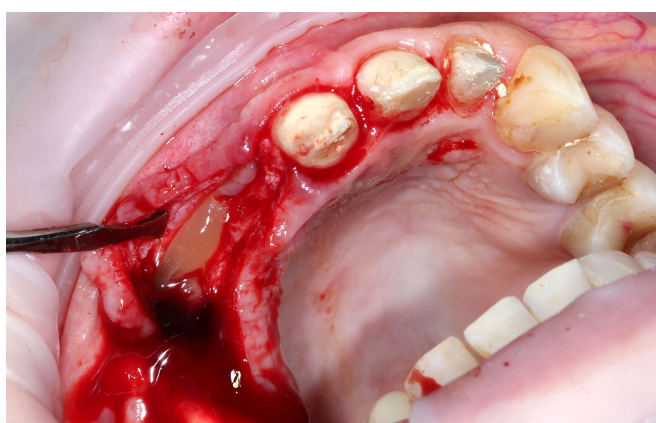


Fig. 6. Suturing



Fig. 7. Suturing

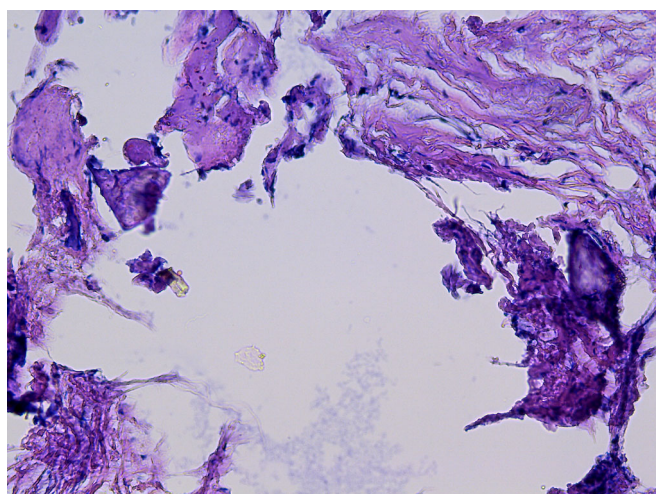


Fig. 8. The histology demonstrates bone trabeculae.

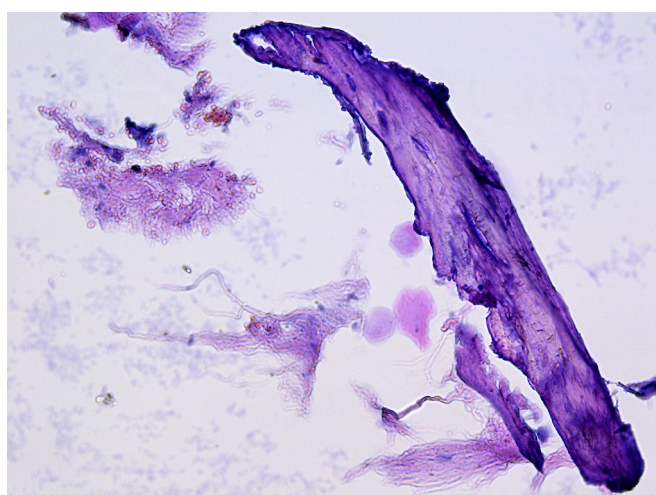


Fig. 9. The histology demonstrates peri osseous fibrosis.

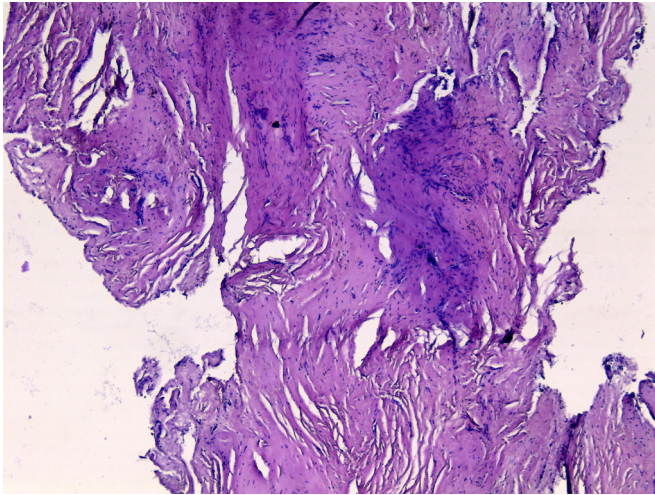


Fig. 10. Postoperative view after 2 weeks



RESULTS:

Two weeks after the procedure full relief of the preoperative symptoms that dated from the time of GBR had been done in 2012 have been established. The normal architecture of the residual bone and alveolar mucosa has been restored. A new CBCT has been taken to evaluate the new clinical situation for months later (Fig. 11, 12).

Fig. 11. A new CBCT after the surgical procedure.

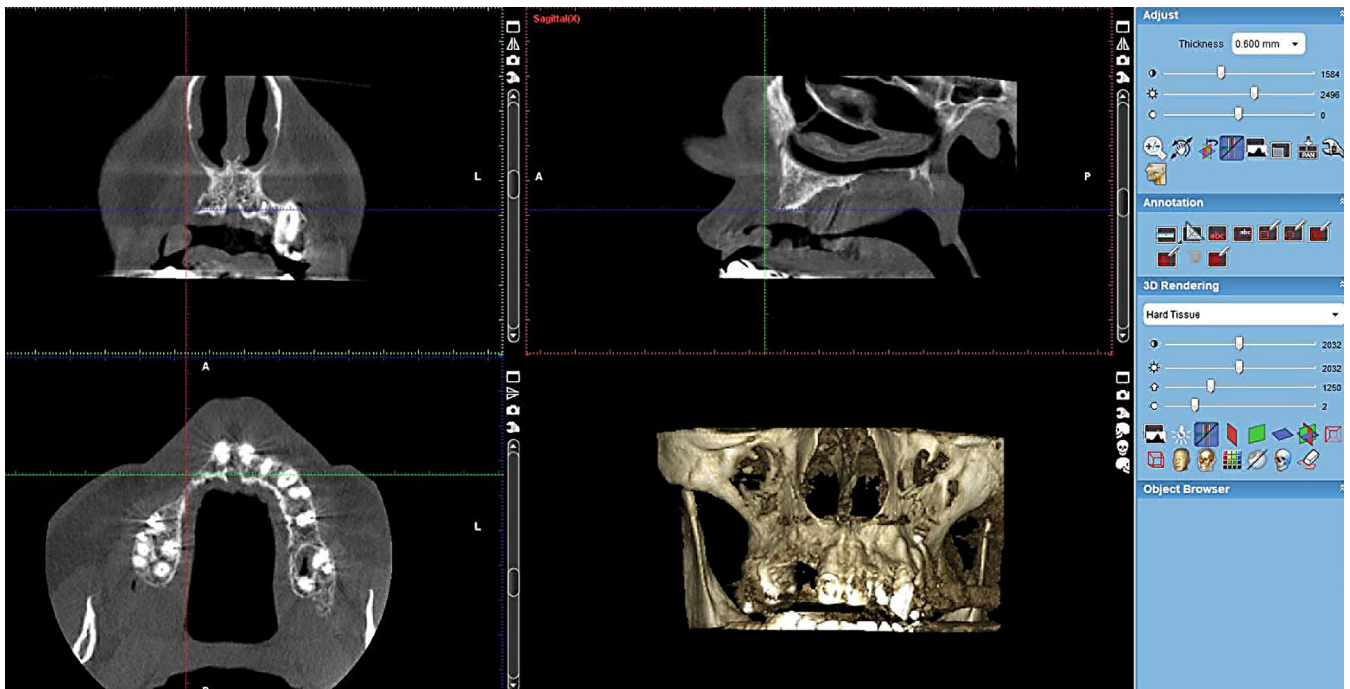
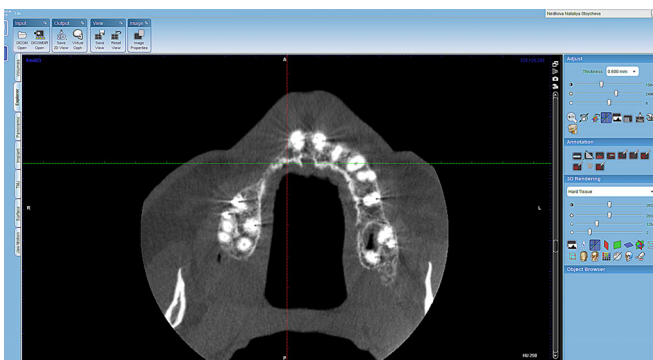


Fig. 12. A new CBCT after the surgical procedure.



DISCUSSION

Nowadays the replacement of lost teeth due to restorative failure or periodontal disease with dental implants is a common clinical situation and due to the fact that there are many clinical situations in which there is a need to restore the lost soft and hard tissues around these implants, a reconstructive procedure has to be performed. The first choice in those situations is guided bone regeneration with the use of bone substitute and a membrane to isolate the bone substitute. The use of xenografts as a widely studied material, is quite often. There are some new studies that propose the use of A-PRF as a membrane that

has some benefits. Adherence to the proposed by Choukroun protocol [5] provides the optimal quality of PRF that can be used either as a membrane (A-PRF) or in injectable form (i-PRF). The preparation technique for A-PRF consists of the following: blood is drawn from vena cephalica or vena basilica (vena mediana cubiti) using a sterile 10 ml vacutainer just before or during surgery. The collection of the blood until it is placed into the centrifuge should not exceed 2 minutes so that optimal quality of PRF can be achieved. At the end of the centrifugation spin, the A-PRF caps are removed and the tubes are placed in a sterile tube holder. With the use of a sterile tweezer the A-PRF is extracted and if needed scissors are also used to remove the red blood cells from the fibrin clot. PRF has several benefits that makes the material clinically effective. Such advantages of PRF are: cost-effective and autogenous material, it is easy and efficient to use, it has reduced donor site morbidity and last but not least by introducing platelets growth factors such as: TGF- β , PDGF, IGF-1, VEGF and EGF demonstrates that PRF has increased healing potential and accelerates tissue healing and regeneration [6, 7]. In our case, we considered placing A-PRF (Figure 5) in order to improve the angiogenesis in the area, by enhancing the growth factors that contain this autologous material.

Bovine bone substitutes are one of the most commonly used xenografts in dentistry [8]. Commonly used xenograft material in dental practice is BioOss and other trademarks that provide mechanical support and demonstrate osteoconduction and have been used extensively in maxillary sinus floor elevation and implant procedures

due to their superior stability and low immunogenicity [9]. However, the long-term risks and late complications of bovine-bone xenografts are not well studied and there is a lack of information in the literature above that. Reported complications are: acute and chronic sinusitis, maxillary fungus ball, material displacement, immune reactions, chronic inflammation, foreign body reaction [10, 11, 12, 13, 14].

The bovine bone xenograft is not biodegradable. Mordenfeld et al. [15] demonstrated in their study that deproteinized bovine bone particles are not biodegraded after 10 years. In another study made by Traini et al. [16] such residual particles of an organic bovine bone are found after 20 years in humans. This clinical performance can be considered an advantage for the clinician, providing long-term esthetic results. On the other hand, this fact permits the xenograft to stay in the tissues even if inflammation occurs and due to that fact, the inflammation cannot be resolved by the inflammatory process itself, because the material is not resorbable.

CONCLUSION

The use of bone substitutes and especially xenografts should be used with caution because they are not resorbable and a potential infection around the graft particles might have long-term biological complications. The long term safe use of xenografts and their potential association with the disease are valid concerns in dental regenerative procedures. More clinical studies have to be performed so the risk for the patient and for the failure of the procedure is minimal in the long-term.

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