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Complications in the guided bone regeneration technique associated with the d-PTFE membrane: case report

Complicações na técnica de regeneração óssea guiada associada à membrana de PTFE-d: relato de caso

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ABSTRACT

Guided bone regeneration aims to gain vertical and horizontal bone volume in atrophic ridges, using different regenerative techniques associated with biomaterials, with occasional post-surgical complications. The objective of the case report was to describe the successive approaches to minimize and eliminate the complications presented in the postoperative period of a patient submitted to the guided bone regeneration technique. In the first surgery, the dense expanded polytetrafluoroethylene membrane (d-PTFE), supported by the tent technique and autogenous platelet graft, was used to perform the guided bone regeneration technique. After three months, the membrane was exposed, with the membrane and the retaining screws removed in the seventh month, with the installation of three Internal Hexagon implants in the areas of teeth 13, 14 and 15. The exposed threads were covered with hydroxyapatites resorbable and covered with d-PTFE membrane. A four-month postoperative panoramic radiograph suggested implant osseointegration. The guided bone regeneration technique associated with the d-PTFE membrane enabled bone neoformation, enabling the installation of osseointegrated implants in an aesthetic and functional position. The exposure of the edges of the membrane allowed the penetration of fluids and contamination, suggesting the worsening of the signs of infection and purulent secretion. On the contrary, the exposure of central areas did not cause inflammatory and infectious signs.

Indexing terms: Bone regeneration. Biocompatible materials. Dental implants.

RESUMO

A regeneração óssea guiada visa o ganho de volume ósseo vertical e horizontal em rebordos atróficos, sendo utilizadas diferentes técnicas regenerativas associadas a biomateriais, podendo apresentar ocasionais complicações pós-cirúrgicas. O objetivo do relato de caso foi descrever as sucessivas abordagens para minimizar e eliminar as complicações apresentadas no pós-operatório de paciente submetida à técnica de regeneração óssea guiada. Na primeira cirurgia foi utilizada a membrana de politetrafluoretileno expandido

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denso (PTFE-d), suportada pela técnica da tenda e enxerto plaquetário autógeno, para realizar a técnica de regeneração óssea guiada. Após três meses, constatou-se a exposição da membrana, sendo removida a membrana e os parafusos de contenção no sétimo mês, com instalação de três implantes Hexágono Interno nas áreas dos dentes 13, 14 e 15. As roscas expostas foram recobertas com as hidroxiapatitas reabsorvíeis e recobertas com membrana PTFE-d. A radiografia panorâmica pós-operatória de quatro meses sugeriu osseointegração dos implantes. A técnica de regeneração óssea guiada associada à membrana de PTFE-d possibilitou a neoformação óssea propiciando a instalação de implantes osseointegrados em posição estética e funcional. A exposição das bordas da membrana permitiu a penetração de fluídos e contaminação, sugerindo o agravamento dos sinais de infecção e secreção purulenta. Ao contrário, a exposição de áreas centrais, não acarretou sinais inflamatórios e infecciosos.

Termos de indexação: *Regeneração óssea. Materiais biocompatíveis. Implantes dentários.*

INTRODUCTION

Preserving the volume of alveolar processes is a challenge for dentists who aim to rehabilitate patients with implant-supported prostheses. For such situations, the guided bone regeneration technique (GBR) and immediate implants help to preserve bone volume when associated with different existing biomaterials [1]. The GBR technique is indicated for reconstruction of alveolar ridges, as in the case of tooth extractions followed by installation of osseointegrated implants, maintaining bone thickness and height [1,2]. It is based on the hypothesis that a membrane acts as a physical barrier when superimposed on the bone defect, preventing the presence of undesirable cells for bone repair, such as the oral epithelium and connective tissue, and thus facilitating the bone regeneration process that occurs in a slower rate than soft tissue [1,2]. Resorbable membranes, such as those based on collagen, and non-resorbable ones, such as those based on expanded polytetrafluoroethylene, e-PTFE, and dense, d-PTFE, are used to stabilize the graft, limit graft resorption and act as an occlusive barrier to soft tissue [1,2]. To achieve success, it is imperative that there is, below the membrane, a space that must be maintained through metal screws using the tent technique or to support the membrane through the remaining bone or biomaterial [1]. However, such maneuvers must be accompanied by a relaxation of the soft tissue during the closing of the surgical site, in order to reduce tissue tension and ensure adequate vascular supply. Failures in this maneuver are indicated as one of the possible causes of the high exposure rate of non-absorbable membranes when compared to absorbable membranes [3].

In parallel, regenerative therapy seeks to resolve or minimize the aesthetic and functional damage caused by extensive bone loss. In this context, platelet concentrates are designed to release platelets and growth factors at the surgical site in order to enhance healing and tissue regeneration [4]. Platelet-rich fibrin (PRF) is a fibrin matrix with platelets, cytokines, growth factors, and trapped cells. Used as an autologous resorbable membrane, platelet- and leukocyte-rich fibrin (L-PRF) is considered a biomaterial in plastic surgery, bone defect regeneration, mucosal healing, maxillary sinus lifting, implantology, bone volume increase, bone regeneration guided, alveolar preservation and in osteonecrosis of the jaws associated with the use of bisphosphonates [5-8].

Bone grafts, on the other hand, are used to induce bone formation in areas with extensive bone loss and must have qualities such as osteoinduction, osteoconduction and mechanical stability. Grafts can be classified as autogenous grafts, recipient and donor being the same individual, allogeneic grafts, obtained from a bone bank, xenografts, grafts of a different species from the recipient [9] and bioceramics, classified as alloplastic or synthetic, depending on the methodology of biomaterial manufacturing [10].

The physical, chemical and biological properties of bone grafts can be enhanced when associated with the L-PRF technique, converging in better clinical results. Guéhennec et al. [10] reported the association of a three-dimensional fibrin mesh with the microstructure of bone biomaterials. The authors suggested a better initial stability in the bone filling through the adhesion of the bone tissue walls promoted by fibrin. Regarding biological properties, the authors suggested a positive effect of fibrin associated with bone graft, due to neovascularization, development of a highly vascularized granulation tissue and the presence of different growth factors, promoted by fibrin [10].

This paper aims to describe, through a clinical report, the successive approaches to minimize and eliminate complications presented in the postoperative period of a patient undergoing the GBR technique. In the first surgical

stage, a d-PTFE membrane with titanium reinforcement supported by the tent technique and autogenous platelet graft, through the L-PRF technique, was used for the GBR technique, sequencing the successive repair interventions in order to eliminate the complications presented in this case.

CASE REPORT

The patient was seen at the Implantology Specialization Clinic of the Faculty of Dentistry of the State University of Rio de Janeiro (UERJ), and was informed about the free consent form provided by the UERJ ethics committee.

Female patient, 52 years old, white. The anamnesis revealed a history of an excisional biopsy performed two years earlier in the area of tooth 14, due to the presence of an antral pseudocyst, seen in the tomography performed before the excisional biopsy (figure 1). Clinical evaluation revealed a coronal-radicular fracture in dental elements 13 and 15 associated with moderate alveolar bone crest resorption with marked bone loss in the alveolar vestibular wall in element 15. The tomography indicated moderate alveolar bone crest resorption in teeth 13 and 15, accentuating in teeth element 14 region with loss of the buccal bone wall (figure 2). For this case, the chosen therapeutic approach was the GBR, aiming at a vertical and horizontal bone gain, for a subsequent installation of integrated bone implants.

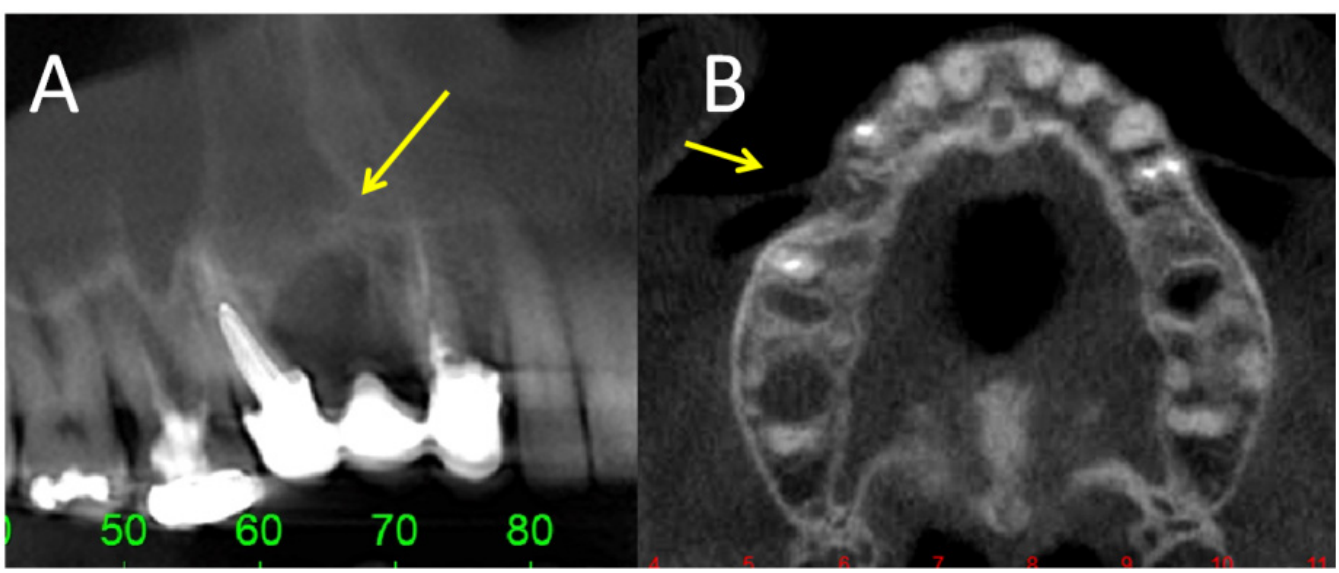

Figure 1. Cone beam computed tomography performed prior to the excisional biopsy reported by the patient in her history. Hyperdense image, dome of regular contour on the floor of the right maxillary sinus (images A and B, yellow arrow), suggestive of antral pseudocyst.

Due to the surgical extension associated with the need for bone grafting, with displacement of mucous tissue and presence of non-absorbable membrane, a previous drug protocol was adopted to control pain, edema and possible infection, with a broad-spectrum antibiotic coverage due to the characteristic population of oral microflora, with anaerobic, aerobic and/or facultative bacteria, in addition to gram-negative and gram-positive bacteria. The patient started the medication protocol 1 h before surgery with: Clavulin 4 pills (amoxicillin 500mg and potassium clavulanate 125mg) and Dexamethasone (4mg) 2 pills. Postoperatively: Clavulin 1 pill (amoxicillin 500mg and potassium clavulanate 125mg) 8/8 h for 10 days, Dexamethasone (4 mg) 2 pills, 24 hours after surgery plus 1 dose of 1 pill the following day. Nimesulide 100 mg 1 pill, 12/12 hours for 5 days and Dipyrone 1 g in case of pain. At the surgical site, Peroxidin gel 2 to 3 times a day for 15 days, controlling and reducing the local oral microbial load.

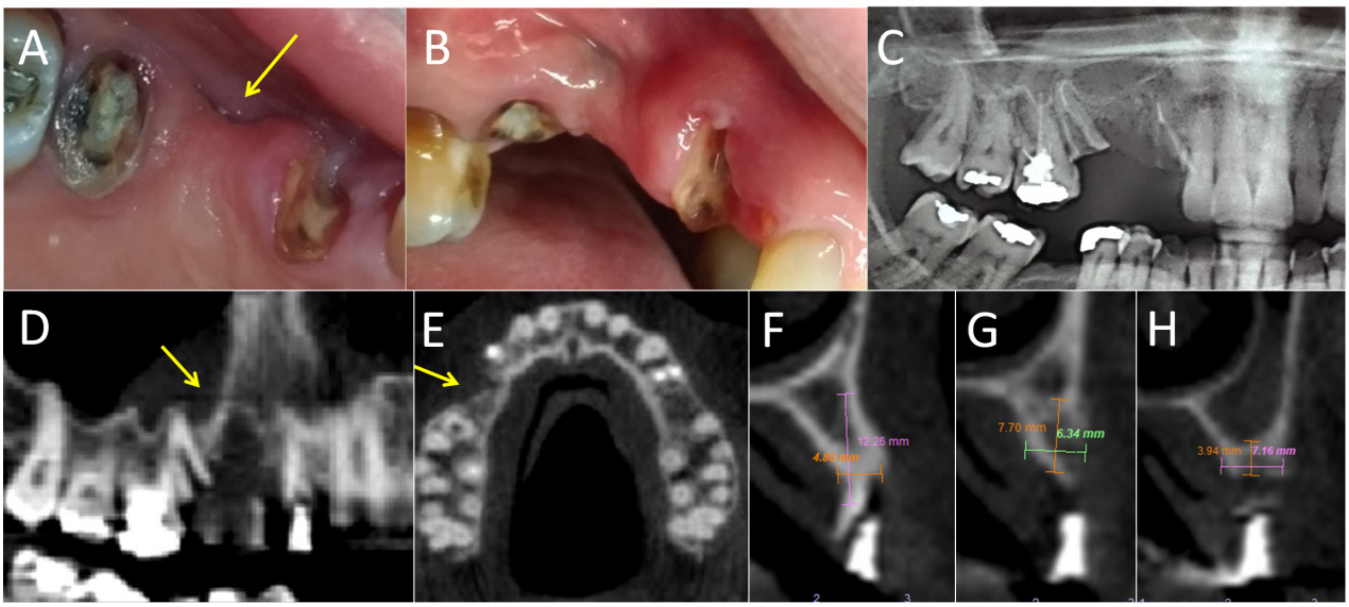

Figure 2. Clinical, radiographic and tomographic condition presented in the patient's clinical evaluation: coronaroot fracture in dental elements 13 and 15 associated with moderate resorption of the alveolar bone crest with marked retraction of the alveolar vestibular wall in element 15 (A, B and C). Panoramic (D) and axial (E) sections demonstrate severe cortical retraction. The cross-sectional view revealed moderate resorption of the alveolar bone crest in dental elements 13 (F), 14 (G) and 15 (H).

PRF - Preparation and application

The PRF was prepared following the protocol developed by Choukroun [11]. Before surgery, venous blood was collected in 8 sterile 10ml tubes without anticoagulant and immediately centrifuged at 2700 RPM to divide the blood sample into three layers. The base with sedimented red cells, the middle part with the PRF clot and the upper part with acellular plasma [6]. Two tubes were centrifuged for 3 min to prepare the PRF-block, an aggregate of biomaterial resulting from the association of PRF with particulate biomaterial. The remaining six tubes were centrifuged for 12 min to prepare the L-PRF membranes. After centrifugation for 12 min, the PRF clot was collected from the six tubes with sterile forceps, and then the separation of the red corpuscle from the PRF clot was performed, keeping the junction of red bodies with fibrin, buff-colt, intact, followed by the compression in the PRF-Box, metal box for compression and obtaining the L-PRF membrane.

An L-PRF membrane was minced and mixed with liquid fibrin from the two PRF tubes which were centrifuged for 3 min. This mixture was added to 1 g of synthetic porous hydroxyapatite granules, 0.25 - 1.00 mm (Alobone Poros - Osseocon Biomaterials Ltda, Rio de Janeiro, Brazil) to prepare the PRF-block, thus generating a moldable compound to the surgical area (figure 3).

Surgical protocol

The surgical indication for the patient was GRB. After supracrestal and oblique incisions for relaxation purposes, a total flap of the alveolar mucosa was performed, with atraumatic extraction of the dental elements, curettage to remove granulation tissue and decorticalization of the alveolar ridge. Subsequently, a 30mm x 40mm titanium-reinforced d-PTFE membrane (Cytoplast, Implacil De Bortoli, São Paulo, Brazil) was fixed on the palatal face, with a 1.5 x 3.0 mm Self-Drilling Implant screw and another 1 .5 x 5.0 mm (Implacil De Bortoli, São Paulo, Brazil) on the alveolar crest in order to ensure support under the membrane (figure 3). Next, bone biomaterial associated with the PRF technique was added over the alveolar defect (figure 3).

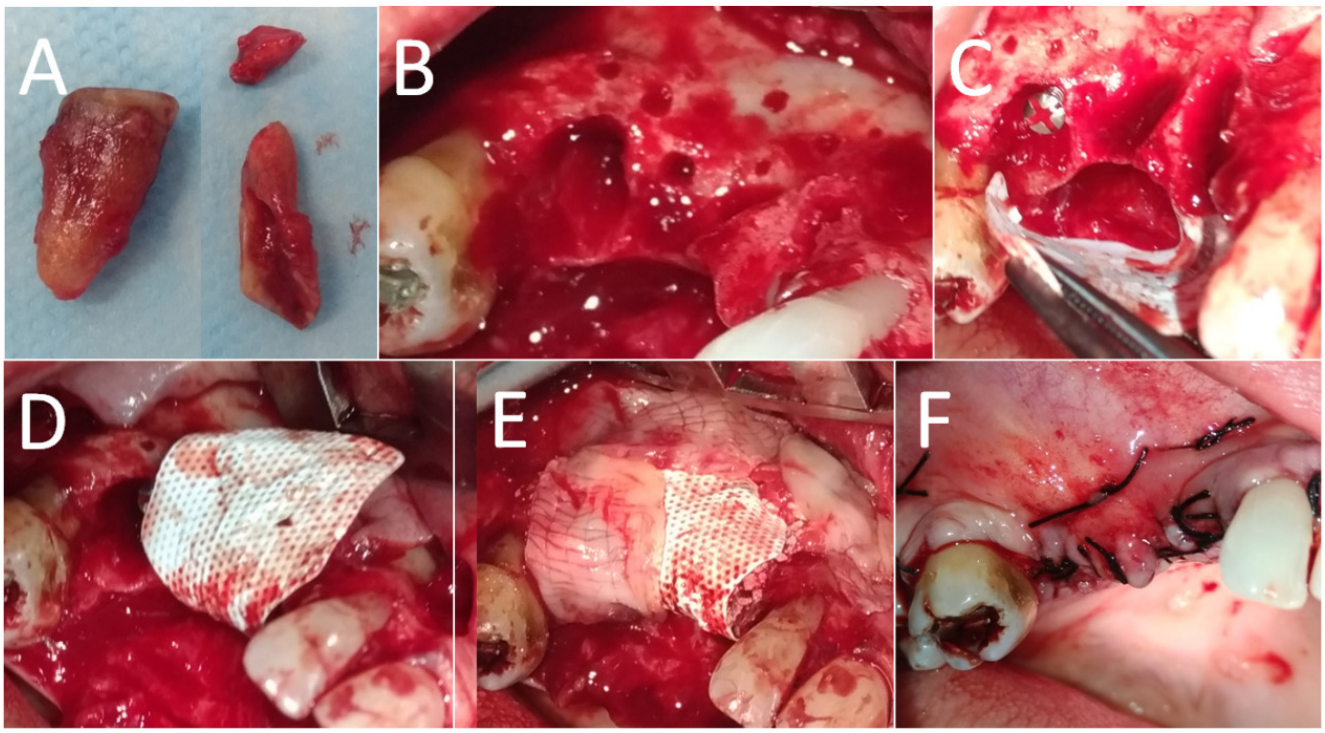

Figure 3. GBR surgery to correct the bone defect: after extraction due to fracture and contamination (A), the alveolus was curetted and decorticalized (B). With the fixation of the membrane on the palatal face (C), the insertion of the graft (D) and coating with the L-PRF membrane (E) followed, ending with horizontal mattress sutures and several simple sutures (F).

After accommodation of the biomaterial, the membrane was fixed to the cortical vestibular wall with two 1.5 x 3.0 mm screws on the proximal edges of the membrane, covered with two L-PRF membranes and finished with two horizontal mattress sutures and several simple sutures (Figure 3).

Management of post-surgical complications

Three months after the operation, two small areas of membrane exposure were verified, suggesting one of them to be the surface of the membrane and the other the tip of a bone spike, close to the distal face of the dental element 12. It was found that the exposure of the membrane increased significantly until, in the seventh month, the presence of purulent exudate was verified, draining below the membrane exposure site, with digital pressure. A new tomography of the area was requested in order to schedule the surgery to remove the membrane, being advised during this period to reuse the same protocol with Clavulin (amoxicillin 500mg and potassium clavulanate 125mg) for 15 days and to apply Chlorhexidine gel 0.12% in the local.

After comparing the two CT scans, it was possible to verify the filling of the alveoli where the extractions of dental elements 13 and 15 took place. There was a vertical gain in the region of element 13 and a space between the membrane and the bone crest, which is an indicative sign loss of grafting material. Possibly, the inflammatory process present in this area made it impossible to incorporate the graft under the membrane and bone neoformation, leading to the creation of an empty space below the membrane and its exposure (figure 4).

After 14 days of the onset of the presence of purulent exudate, the second surgery was performed. After removing the buccal and palatal screws and the membrane, the presence of a granulomatous tissue was found, which was curetted, removed and placed in a 10% formalin solution. The material was sent for analysis at the Oral Pathology Laboratory of the Faculty of Dentistry of the State University of Rio de Janeiro (UERJ). Then, HI implants (Implacil De

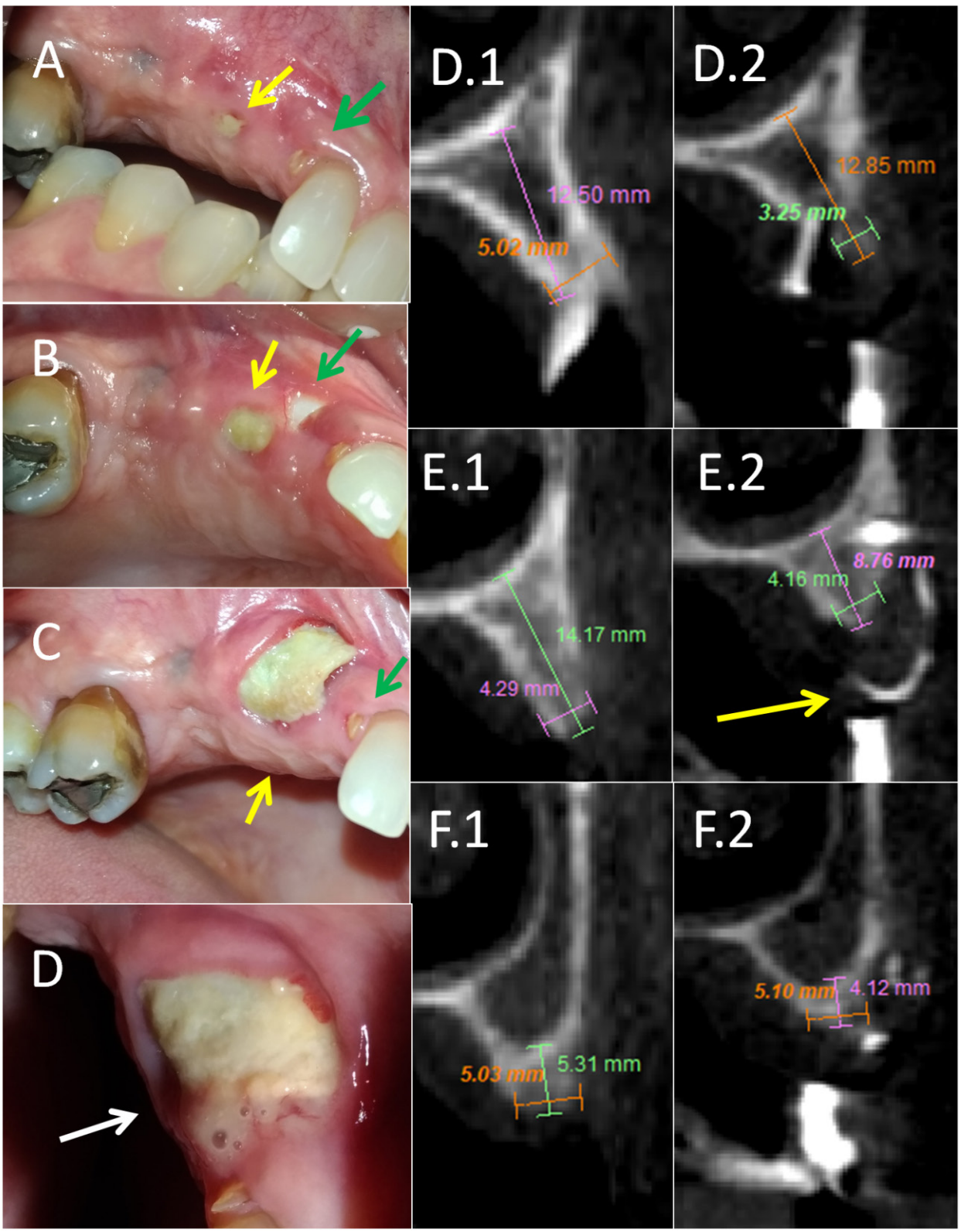

Figure 4. Postoperative period with membrane exposure: After three months of membrane maintenance, a small area of membrane exposure (yellow arrow) and the appearance of a bone spike (green arrow) were verified (A). At four months (B) and six months (C) there was an increase in the exhibition area, with the presence of a purulent collection at seven months (D). Comparison of areas before and after GBR surgery using the membrane of tooth 13 (D.1, before and D.2, after), tooth 14 (E.1 before, E.2, after), tooth 15 (F.1 before and F.2 after). Image E2 identifies space between membrane and bone cortical with absence of graft, yellow arrow.

Bortoli, São Paulo, Brazil) were installed in the areas of dental elements 13 (4.0mm x 13mm), 14 (4.0mm x 11mm) and 15 (4.0mm x 5mm), leaving three exposed threads on the first two implants and a thread on the last one (figure 5).

The threads were coated with Bovine hydroxyapatite (1.0 g) (Extragraft XG-13, Silvestre Labs, lot 6079610, Rio de Janeiro, Brazil) on the buccal cortex of the bone defect. A non-ceramic synthetic hydroxyapatite (Osteogen, Intra-Lock, São Paulo, Brazil), with gradual and homogeneous resorption, was also associated with the biomaterial, in order to enhance local bone formation. The biomaterials were covered with d-PTFE membrane with titanium reinforcement, 25mmx 30mm (Cytoplast TXT 200, Implacil De Bortioli, São Paulo, Brazil), fixed with two 1.5 x 3.0 mm Self-Drilling Implant screws in the vestibular cortex and two in the palatine cortex and the surgery was completed with simple sutures using PTFE monofilament suture (figure 5).

One week after the operation, the membrane was already exposed, and it was sutured again. However, seven days later, the site showed greater exposure, following the progression of exposure until the 34th day, which was removed from the surgical site (figure 5).

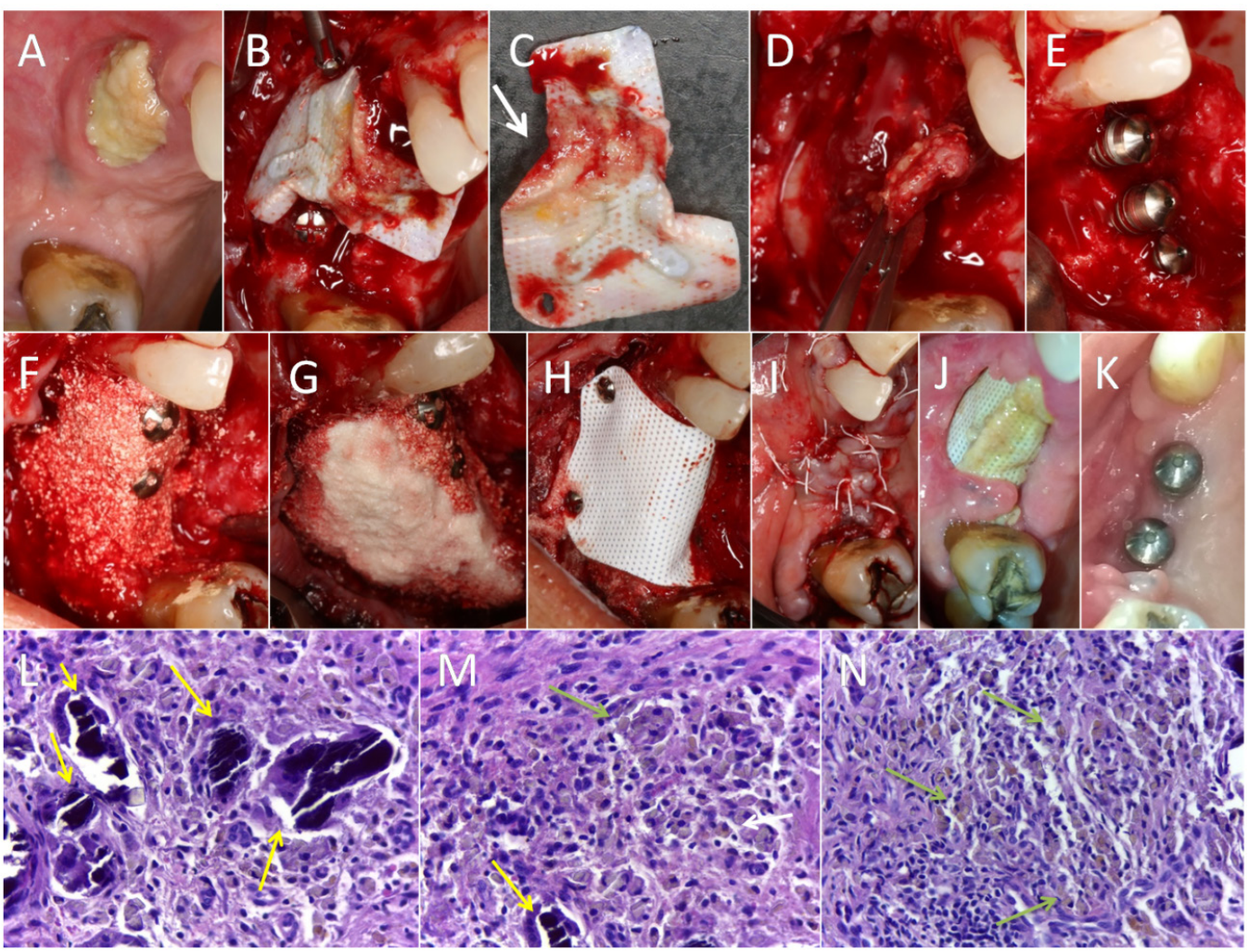

Figure 5. Second surgical intervention for GBR and placement of integrated bone implants. After exposing the membrane associated with drainage of purulent collection (A), the Orth Implant screws (B) and the membrane (Image C) were removed. Changes in the texture of the membrane surface were verified at the oral exposure site (white arrow) (D). After removal of the granulation tissue (D), the implants were installed (E) with subsequent coverage of biomaterial over the exposed threads and over the alveolus (F and G), fixed with Orth implant screws to the membrane (H). At the end, the tissue was repositioned, relaxed and sutured with PTFE monofilament thread (K). Removal of the membrane after a new exposure 34 days after the operation (J). Area after tissue healing with two exposed implants and one implant still buried (K). Microscopic image of the biopsy with 40x magnification, staining with hematoxylin and eosin demonstrating nonspecific chronic inflammatory process with large amounts of neutrophils, hemorrhage, fragment of exogenous material, biomaterial (L and M, yellow arrows), and calcifications (M and N , green arrows).

Four months after installation of the implants, the panoramic radiography showed an image suggestive of osseointegration of the implants, remaining without bone formation where the exposed threads in the implants teeth 13 and 14 were kept. The implants had no mobility and no changes, allowing the installation of implant healing and temporization with adhesive prosthesis with metallic infrastructure and acrylic resin (figure 6).

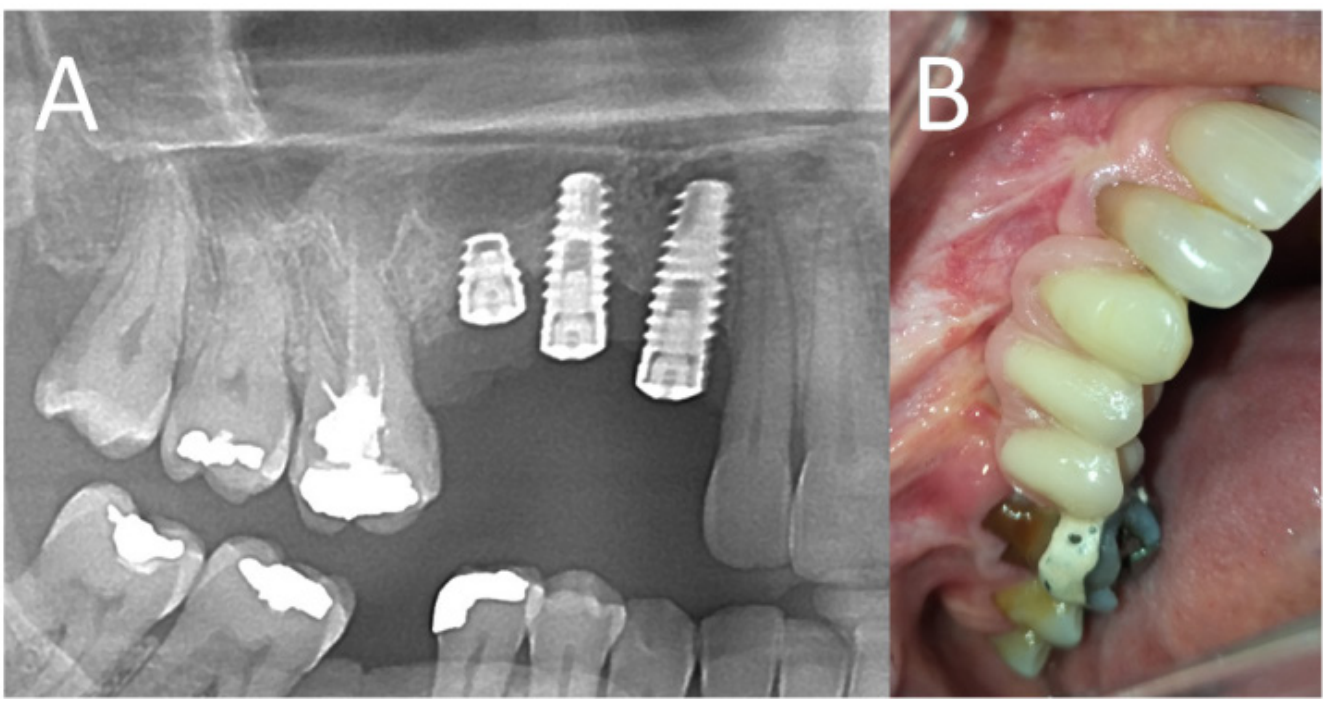

Figure 6. Post-surgical control radiograph. Image suggestive of implant osseointegration (A) and adhesive temporization with metallic infrastructure and acrylic resin, in order to avoid premature overload on the implants.

DISCUSSION

Among the non-absorbable membranes, the PTFE membrane is reported as an option for the GBR technique with favorable clinical results [1,12,13]. The ideal characteristics of a membrane are: biocompatibility, semipermeability, inert, mechanically resistant, sterilizable, not having carcinogenic or allergenic potential [12,14]. The absence of one or more of these requirements may be the reason for the failure in the performance of the GBR technique [12,14]. The e-PTFE membrane, on the other hand, is a non-absorbable, inert physical barrier, with a modulus of elasticity similar to fibrous and bone tissue, which does not trigger an inflammatory reaction from a foreign body, has the ability to create a biological space, in addition to having an experience of use clinical of more than 20 years [12,14]. The GBR associated with the e-PTFE membrane has a good prognosis and viability when the basic requirements for its application are used [12], such as the adequate closure of the soft tissues that prevents the occurrence of tissue dehiscence, exposing the membrane [15]. The d-PTFE membrane, on the other hand, does not require this primary closure due to its low porosity, which can be exposed [16].

The disadvantages of non-absorbable membranes are the high rate of complications, such as surgical wound dehiscence, plaque accumulation and infection, relatively high cost and the need to perform two surgical times for subsequent removal of the membrane [12,14,15]. Due to exposure to the oral environment, the main disadvantage is bacterial contamination [13], leading to an early removal of the membrane, affecting the quantity and quality of regenerated bone [13]. This early exposure should be monitored regularly, and prophylactic antibiotic coverage should

be evaluated in cases of increased exposure. The exposure of the surgical site in an oral environment, with a mixed oral microflora, could aggravate the exposure picture, leading to the formation of a purulent collection. In the case presented here, the need for infectious control led to repeated courses of antibiotics, in order to try to control the local infection, allowing the length of time the PTFE membrane remains in place so that a minimum of bone neoformation occurred.

However, the structure of d-PTFE membranes, with porosity less than 0.3 μm, presents greater resistance to bacterial penetration, protecting the bone and the implant below this membrane [15]. In addition, this structure does not require the primary closure of tissues, due to its low porosity (0.2 μm), which can be exposed, containing the graft particles and facilitating the preservation of the keratinized mucosa [16,17]. Laurito et al. [18] reported the preservation of 10 alveolar ridges with 28-day intentional exposure of the d-PTFE membrane membrane. The authors reported plaque accumulation on the surface of the exposed membranes and inflammation of the gingival margins in some patients, but in no case there was infection or sign of pain. Gallo et al. [19] described 80 cases of complications with d-PTFE, in which most of them appeared before two months, with exposures of varying size, combining suppurations, fistulas and facial abscesses. Even with premature exposure of the d-PTFE membrane, reports of successful bone gain for implant placement were found [17].

Therefore, the early removal of the membrane motivated by the exposure of the membrane after 3 months could represent the failure of the GBR technique surgery. However, the specialist must balance a balance between the permanence of the exposed membrane, in order to guarantee the minimum amount and quality of regenerated bone needed [13], and the risk of developing or perpetuating a local infectious condition, which can lead to loss of biomaterial with associated bone destruction. Due to the patient's high bone loss, in the case presented, the decision was made to maintain the membrane with local antibiotic control associated with tomographic image control, in order to try to achieve a minimum time of 6 to 9 months [20], necessary for an effective bone neoformation, when the membrane was removed. Upon finding a purulent secretion draining below the membrane, its immediate removal should be considered, due to an assessment of local risk and benefit.

The classification of complications of non-absorbable membranes allows the implantodontist to identify the problem with standardization of treatment and prognosis protocols [20]. Fontana et al. [20] proposed a classification for e-PTFE membranes, as: Class I - exposure ≤ 3 mm without exudate; Class II – large exposure > 3 mm without exudate; Class III - membrane exposure with purulent exudate and Class IV - abscess formation without membrane exposure. This framework was later used for PTFE-d membranes with titanium reinforcement [19].

The lower porosity of the d-PTFE membrane compared to the e-PTFE membrane selects it as the best clinical indication for cases of extraction and grafting, where the possibility of membrane exposure is greater [16,17]. As it resists bacterial incorporation, the application of this membrane presents a low risk of infection and reduced loss of bone graft. In the case presented in this article, even with the presence of purulent drainage below the membrane, it was possible to verify the filling of the alveoli where the extractions of dental elements 13 and 15 occurred, with a reduced vertical gain in element 13 (figure 4). However, in the area of element 14, where the membrane was exposed, there was a small loss of vertical and horizontal height, which makes it possible to suppose that this is the area of origin of the infection. However, the histopathological analysis of this area revealed the presence of areas of calcifications, bone neoformations, which suggests the continuity of osteogenesis in the grafted site even with the presence of an inflammatory process. It is noteworthy that this area had a history of biopsy of an antral pseudocyst, from which it was not possible to obtain the histopathological diagnosis for subsequent correlation. It was possible to verify that Gallo et al. [19] described a clinical picture similar to that found in this study, with graft contraction and soft tissue replacement with the presence of granulomatous tissue under the d-PTFE membrane in Class III cases.

Another fact to consider in the present case was the possibility of studying dehiscence with exposure of the d-PTFE membrane at different times and characteristics in the same patient. In the first exposure, the lateral edge of the membrane was lifted, on the mesial surface, facilitating the penetration of fluids and contamination under the membrane, leading to infection and purulent secretion. On the second exposure, the membrane margins were protected by the connective tissue, leaving only the central area exposed, not causing the presence of suppuration or inflammatory

condition. This fact suggests that the margins of the d-PTFE membrane must be protected by the connective tissue, not allowing a contamination under the membrane. Ghensi et al. [17] described the peripheral sealing between the barrier and the host bone as one of the success factors for GBR. This exposure characteristic must be taken into account when analyzing the classification of complications of non-absorbable membranes [19,20]. In addition to the classes presented, the issue of membrane edges should be evaluated, considering the coverage and integrity of the edges by the connective tissue. Once, when analyzing the different times of exposure of the d-PTFE membrane, the exposure of the membrane edges facilitated the penetration of fluids and contamination under the membrane, leading to aggravation of the signs of infection and purulent secretion. On the other hand, the exposure of central areas, without compromising the edges, did not cause inflammatory and infectious signs. Membrane exposure in the second surgery was suggested to be more related to soft tissue relaxation, necessary to ensure adequate membrane coverage [1]. The tissue already compromised, due to the first surgery, showed a reduction in its elasticity, due to local fibrosis resulting from the scarring process of the first surgery.

With the exposure of the membrane associated with suppuration, the maneuvers found range from curettage, irrigation with saline solution and 0.12% Chlorhexidine mouthwash or application of 1% Chlorhexidine gel, to reopening the flap for removal of the total membrane or partial removal of the membrane [13,20,21].

Maridate et al. [15] reported the management of exposure of a d-PTFE membrane on tooth 24 fixed with four screws, over bovine bone graft and osseointegrated implant. After 14 days, there was wound dehiscence with exposure of the membrane greater than three millimeters, remaining for another two weeks to remove the d-PTFE membrane and fixation screws, also associating a connective graft to close the dehiscence communication. The bone graft appeared to be intact and without signs of infection [15]. The same membrane exposure time was reported by Ghensi et al. [17] remaining for four months for removal.

Another study indicates that the titanium-reinforced e-PTFE membrane was exposed in 15% of reported cases, starting exposure two weeks after the operation. Signs of soft tissue inflammation, exudate or fistula formation were also found in 37% of cases, with the membrane being removed prematurely due to site infection in three of these cases [21]. The tent technique was used in the first stage of GBR as it is a safe and effective method for vertical and horizontal bone gain. It consists of installing screws perpendicularly to the bone, for horizontal gain or vertically to the alveolar process, for vertical gain, followed by bone graft deposition around the screws and the membrane covering the entire region [13]. This technique allows for expansion of the soft tissue and prevents tissue contraction around the graft, stabilizing the area and membrane [13]. Even with oral communication and local infection in the associated use of e-PTFE membranes and the tent technique for 60 days post-surgery, Paltanin [13] reported it to be a safe and viable technique. In the case presented, the tent screw installed in the area of tooth 15 made it possible to fill the alveolus, even with all the unfavorable situation of suppuration.

Applying the classification of non-absorbable membrane complications to planning these complications, Gallo et al. [19] indicated 0.12% chlorhexidine gel irrigation twice a day for Class I and Class II, in order to reduce the bacterial population. If the exposure remains clean and with exposure less than three millimeters, the authors indicated that the case should be monitored, completing six to eight weeks of membrane permanence. For Class III, with clinical signs of pain, purulent exposure or fistula, with exposure of the membrane associated with purulent exudate, antibiotic therapy of amoxicillin 500mg and potassium clavulanate 125mg for seven days and removal of the membrane is started. As for Class IV, with the presence of facial abscess, the membrane must be removed immediately with collagen membrane placement, using the same therapeutic protocol for Class III cases and reassessment of the case three months later [19].

Membrane exposure as a consequence of incomplete suture closure may be a consequence of clinical iatrogenesis in one of the surgical stages, such as insufficient flap release leading to lack of passivity, with increased tension and damage to the suture. Another hypothesis may be the occurrence of a soft tissue necrosis evoked during the periosteal incision [15]. In these cases, the repetition of sutures in an attempt to close the dehiscence is not indicated, as the tendency is for a new dehiscence to occur [22]. In the present study, the same occurred when performing new sutures of the dehiscence with exposure of the membranes in the two postoperative moments, with a new exposure after seven days.

Regarding the PRF technique, the L-PRF membrane is a polymerized fibrin gel representing a physical barrier and a first healing agent at the surgical site. This three-dimensional fibrin network is formed by a slow natural polymerization during centrifugation, having great elasticity and strength [7], capable of simulating the extracellular matrix in terms of ultrastructure, which creates an optimized environment for the performance of cells [23,24]. Even with these characteristics, the covering of the d-PTFE membrane with the two L-PRF membranes were not able to prevent the dehiscence that occurred in the postoperative period of the GRB surgery.

CONCLUSION

The use of PTFE membranes in GBR techniques is a sensitive technique requiring meticulous application of the membrane associated with tissue manipulation maneuvers. Even with the reported complications of inflammation, suppuration, insufficient vertical and horizontal height gain, the treatment was successful, since all procedures associated with d-PTFE membranes enabled the installation of osseointegrated implants in an appropriate aesthetic and functional position. The exposure of the membrane edges allowed the penetration of fluids and contamination, suggesting the worsening of the signs of infection and purulent secretion. When exposures occurred in the central areas of the membranes, inflammatory and infectious signs were not detected.

Collaborators

FL Heggendorn, performing the surgery, transcribing the report, planning, interpreting scientific data. BP Figueiredo Filho, performing the surgery, transcribing the report, planning. JLS Pires, execution of surgery, planning. PGP Santos, data interpretation, planning.

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