A successful Schneider membrane perforation repair with leucocyte platelet rich fibrin (L-PRF) - a clinical case report

CARAMÊS, J¹; VIEIRA, F²; MARQUES, H²; SIMÕES, A²; CARAMÊS, G^{2,3}.

1. Implantology Institute, UICOB, Faculty of Dental Medicine, University of Lisbon

2. Caramês Advanced Education Center. Implantology Institute.

3. Herman Ostrow School of Dentistry, University of Southern California

Abstract

A 72-year old, female patient, ASA I, was admitted to the Implantology Institute® (Lisbon, Portugal) with a chief complaint of poor oral masticatory function. Radiographic analysis (panoramic radiography and cone beam computed tomography - CBCT) revealed a residual crestal bone height of less than 3 mm in both posterior maxillary regions. A sinus floor augmentation through lateral window technique with simultaneously implant placement was planned. Antrostomy was performed with a piezoelectric device. Membrane tearing was observed during the 2nd quadrant sinus elevation. Membrane perforation was 10 mm in diameter approximately.

For membrane repair a **two-step technique is proposed**: 1) membrane perforation stabilization through suturing and 2) tent covering with L-PRF membranes. For the first, a resorbable suture is anchored to the bone limit of lateral window. Then, a multi-layer technique approach with leucocyte-platelet rich fibrin (L-PRF) membranes promoted a tent closing and redefined the lower limit of the sinus. A L-PRF block was applied to fill the volume created by SFE. Immediate postoperative healing at 7, 14 and 30 days was uneventful. Absence of associated pain, inflammation or nasal discharge of biomaterial were observed. After 6 months, a cone-beam computerized tomography (CBCT) of the posterior maxilla revealed that all the bone graft inserted in the maxillary sinus was well confined to the area of interest and ensured bone regeneration and implant survival. Implants were loaded at 6 months by a screw retained porcelain-veneered zirconia bridge. A full mouth rehabilitation increasing the vertical dimension of occlusion was considered in this clinical case. A 12-month follow up confirmed the successful sinus floor bone augmentation stability.

Background and Aim

Perforation of the Schneiderian membrane is the most frequent surgical complication of SFE, with a variable incidence ranging between 7% and 44% (1,2). Covering the perforation with resorbable collagen membranes, buccal fat pad flap, connective tissue, fibro- mucosal grafts have been suggested to repair or seal it (3,4). Until now, few authors have described the use of L-PRF for this application. L-PRF membranes release during 7-14 days growth factors: platelet derived growth factor (PDGF), transforming growth factor (TGF), vascular or endothelial growth factor (VEGF) (5). Its biological potential has been associated to positive effects in SFE procedures (6). This case report aims to describe a two-step surgical technique to repair a large perforated Schneiderian membrane with L-PRF membranes and simultaneously perform a sinus floor augmentation with a mixture of xenograft and L-PRF membranes embedded in a fibrin matrix (L-PRF block).

Methods and Materials

1. Diagnostic assessment

Fig. 1. /2. Intraoral view and panoramic radiography illustrating partial edentulism and severe posterior maxilla bone resorption of a 72-year old female patient.

2. Surgical intervention

Fig.3 Large membrane fenestration.

Fig.4 Suturing the membrane to the bone border of lateral window (1st step).

Fig.5 Fenestration stabilization (1st step).

Fig.6 4 layers of L-PRF in a tent covering effect (2nd step).

Fig.7 L-PRF block obtained by mixing liquid fibrinogen with the mixture (4 chopped L-PRF membranes + 1.5g DBBM).

Fig.8 L-PRF membranes obtained according to a standardized protocol (7).

Fig.9 L-PRF block filling.

Fig.10 Simultaneous implant placement.

Fig.11/12 Post operative CBCT confirming the contour of sinus floor elevation.

Results

Fig.13. 6 month CBCT follow-up confirming the sinus floor augmentation stability.

Fig.14, 15, 16 Stage II and final rehabilitation.

Fig. 17. 12 month panoramic radiography follow-up.

Conclusion

This approach seems to provide a favourable Schneiderian membrane sealing, representing a possible alternative to previous described techniques. In addition to its biologic potential, L-PRF membranes provide good mechanical properties and adhesion to soft tissue. The concept of L-PRF block also avoids DBBM dispersion.

Further prospective studies are necessary to validate this surgical protocol.

References

1. Sindel A, Özarslan M, Özalp Ö. Intranasal locking technique: a novel use of the ring block technique at sinus perforations for simultaneous implant placement Int J Oral Maxillofac Surg. 2018 Apr;47(4):499-504.
2. Zijdeveld SA, van den Bergh JP, Schulten EA, ten Bruggenkate CM. Anatomical and surgical findings and complications in 100 consecutive maxillary sinus floor elevation procedures. J Oral Maxillofac Surg. 2008; 66: 1426-38.
3. Öncü E, Kaymaz E. Assessment of the effectiveness of platelet rich fibrin in the treatment of Schneiderian membrane perforation. Clin Implant Dent Relat Res. 2017 Dec; 19(6):1009-1014.
4. Fugazzotto PA, Vlassis J. A simplified classification and repair system for sinus membrane perforations. J Periodontol. 2003;74: 1534-1541.
5. Dohan, D. M., Choukroun, J., Diss, A., Dohan, S. L., Dohan, A. J., Mouhyi, J. & Gogly, B. Platelet-rich fibrin (PRF): a second generation platelet concentrate. Part II: platelet-related biologic features. Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontics 2006; 101, e45-e50.
6. Castro AB, Meschi N, Temmerman A, Pinto N, Lambrechts P, Teughels W, Quirynen M. Regenerative potential of leucocyte- and platelet-rich fibrin. Part B: sinus floor elevation, alveolar ridge preservation, and implant therapy. A systematic review. J Clin Periodontol 2017; 44: 225-234.
7. Miron R, Pinto N, Quirynen M, Ghanaati S. Standardization of relative centrifugal forces in studies related to platelet-rich fibrin. J Periodontol. 2019 Aug;90(8): 817-820.