New bone formation in maxillary sinus with large membrane perforations during graft procedures: a histological study.

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Background and Aim

Background: Sinus lift procedures using the lateral window technique and anorganic bovine bone (ABB) as a graft material are considered a safe and predictable option for bone gain in the posterior maxillae. The most frequent complication reported during maxillary sinus lift procedure is the membrane perforation (MP). Limited evidence is available to determine the influence of large MP on new bone formation in grafted sinuses.

Aim: This study presents implant survival rate and histological information of biopsies taken from grafted sinuses where a large membrane perforation occurred during sinus augmentation procedure.

Large perforation image

Methods and Materials

The present study was reviewed and approved by the ethical committee of the Dental Research Center, São Leopoldo Mandic Dental School (2011/0246). Maxillary sinuses were grafted with the lateral window (LW) technique and exclusively grafted with ABB. Eleven patients who had a large perforation (≥ 10 mm) of the sinus membrane during the sinus augmentation procedure were asked to have a biopsy core. All patients provided written informed consent. Large MP was managed using resorbable suture and a collagen membrane (CM) fixed with tacks and turned into the sinus to seal the perforation. The bone graft was gently packed into the sinus and another CM was placed over the LW and also fixed with tacks. The biopsies specimens were harvested after 8 months using a 3mm trephine from implants site preparation. The biopsies evaluation included vital bone, connective tissue and residual bone graft. Implant survival was considered to be any implant that remained in situ, non-mobile, free from peri-implant radiolucency or infection, and without associated pain, either spontaneous or under pressure.

Large perforation images

Trephine image

Biopsy image

Results

Eleven patients were included and provided one biopsy core each. A total of eleven biopsies were analyzed and the average percentage of vital bone, connective tissue and residual bone graft was 25.50, 35.36 and 39.14, respectively. A total of 29 implants were placed in the sinuses with large MP and after 2 years of functional loading and final prosthodontics rehabilitation the implant survival rate achieved was 100%.

Histological image

Conclusions

Grafted sinuses that exhibited large MP during sinus lifting procedure presented an average percentage vital bone of 25.50 and an implant survival rate of 100%. In conclusion, within the limits of the present study, when properly managed, large MP may provide a satisfactory vital bone formation that allows implant placement and a predictable stability. These findings are in agreement with data available in the literature.

References

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