

# New bone formation comparison in grafted sinuses performed in heavy smokers and non-smokers

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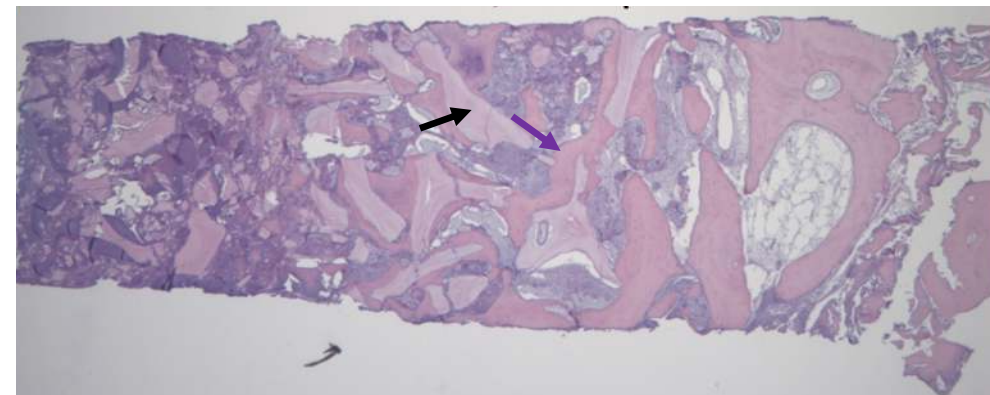
### Abstract

This study presents histological information of biopsies taken from grafted sinuses using exclusively anorganic bovine bone performed in heavy smokers comparing with non-smokers. Maxillary sinuses were grafted with the lateral window (LW) technique using exclusively ABB and a collagen membrane to cover the window. Twenty-four patients were included in the study. Twelve were non-smokers and twelve were classified as heavy smokers ( $\geq 10$  cigarettes/day). All patients provided a written informed consent. Bone biopsies were retrieved using a trephine bur with an inner diameter of 2 mm and outer of 2.8 mm, following the planned long axis of the implant (i.e. crestal approach) which would be immediately installed in the site 8-10 months after sinus graft. The biopsies were stored in paraformaldehyde 4%. The evaluation included new bone formation, connective tissue and residual ABB. 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. The twenty-four patients provided one biopsy core each. A total of twelve biopsies were analyzed for smokers and non-smokers. The new bone formation, residual ABB particles and connective tissue was  $25.67 \pm 8.46$  %,  $26.28 \pm 8.61$  %, and  $47.75 \pm 9.33$  , for smokers and  $27.97 \pm 0.90$  %,  $20.61 \pm 0.71$  % and  $51.42 \pm 0.94$  % for non-smokers, respectively. A total of 26 and 28 implants were installed in smokers and non-smokers presenting an implant survival rate of 96.15% and 100%, respectively, after 2 years of functional loading. There were no differences between the smokers and non-smokers regarding the bone healing after the sinus floor augmentation procedure associated with the ABB.

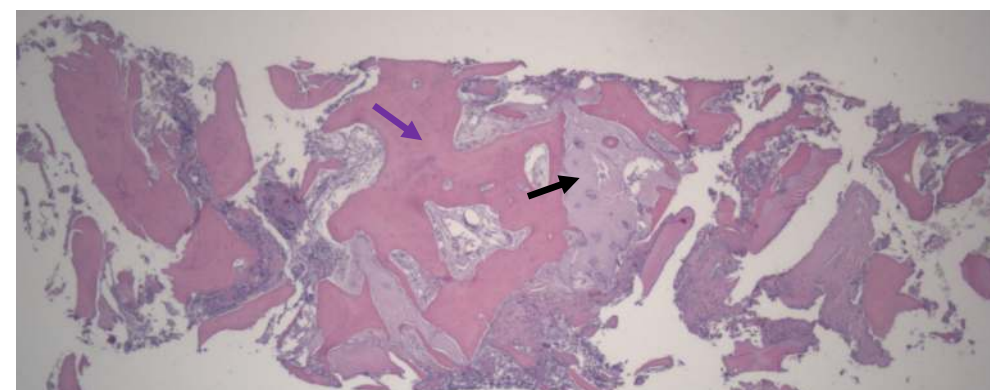
### Results

**Fig.2.** Representative images of the histological sections. Black Arrows represent the bone substitutes remanants and the purple arrows represents the new bone. It is possible to observe a presence of a good pattern of new bone connecting the ABB particles with no differences between smokers and non-smokers.

**Smoker**



**Non-Smoker**



**Table 1.** Mean and standard deviation of the analysis performed in this study.

Parameter	Smokers	Non-Smokers
% Bone	$25.67 \pm 8.46$	$27.97 \pm 0.90$
% Biomaterial	$26.28 \pm 8.61$	$20.61 \pm 0.71$
%Connective Tissue	$47.75 \pm 9.33$	$51.42 \pm 0.94$
%Survival Rates	96.15	100

### Background and Aim

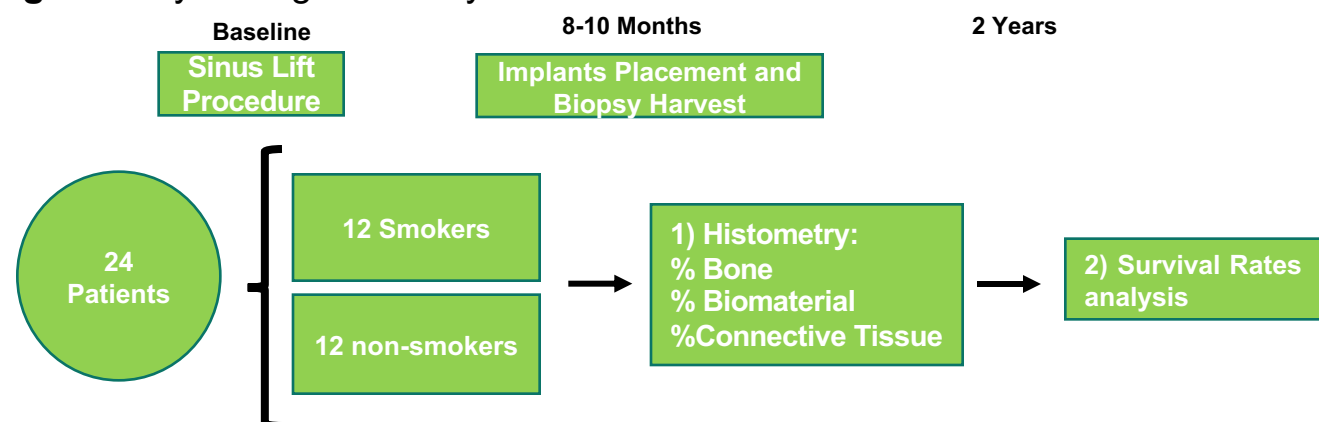
Sinus lift procedures using the lateral window technique and anorganic bovine bone (ABB) as a graft material is considered a safe and predictable option for bone gain in the posterior maxillae (1). There is consistent information in literature demonstrating that smoking habits negatively influence regenerative procedures (2,3). However limited information is available regarding the influence of smoking habits in new bone formation in maxillary sinuses grafted exclusively with ABB. This study presents histological information of biopsies taken from grafted sinuses using exclusively ABB performed in heavy smokers and non-smokers.

### Conclusion

The bone formation and the implants survival rate in grafted areas with ABB was similar between smokers and non-smokers.

### Methods and Materials

**Fig.1.** Study desing and analysis



### References

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- 3) Franceschetti G, Farina R, Stacchi C, Di Lenarda R, Di Raimondo R, Trombelli L. Radiographic outcomes of transcrestal sinus floor elevation performed with a minimally invasive technique in smoker and non-smoker patients. Clin Oral Implants Res. 2014 Apr;25(4):493-9.