L-PRF as Sole Grafting Material in Maxillary Sinus Elevation with Simultaneous Implant Placement Compared to its Association with Mineralized Allograft Cortical Bone: 1-Year Pilot Controlled Clinical Trial.

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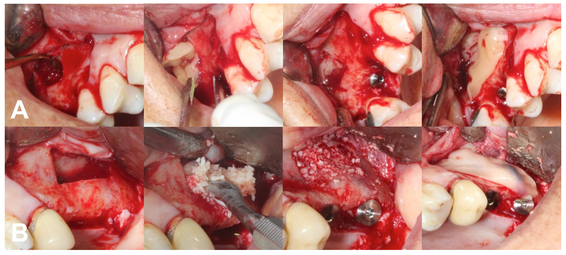
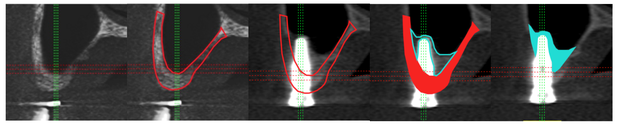
Introduction: Sinus lift technique provides satisfactory and predictable clinical results. However, it requires a long healing time, delaying rehabilitation treatment which brings discomfort to the patients. L-PRF is a second generation platelet concentrate that stimulates and accelerates tissue repair. The objective of this preliminary study was to compare the effect of L-PRF as unique grafting material in maxillary sinus lift with simultaneous implant placement to its association with an allograft material.

Method: Ten maxillary sinuses were treated following a randomized distribution. Six maxillary sinuses received L-PRF as sole grafting material (group A). Four maxillary sinuses received a combination of L-PRF plus an allograft (group B) as filler. In both groups, implants were placed at the sinus lift surgery. Measurements of bone formation in both height and surface area around implants were performed from prior and subsequent CBCT in a 6-11 month post treatment range. A biopsy with trephine at the bony window area was performed in both groups for histological analysis immediately after the CBCT post treatment exam. Multivariate linear regression for each variable was applied with a significance level of 0.05. The survival rate of implants installed was also observed.



A. Surgical sequence using L-PRF as a sole grafting material. B. Surgical sequence using the association of L-PRF and allograft as grafting material.



Superposition technique used to determine the surface area of the graft material. Based on the location of the major axis of the implant in the final CBCT, the site is determined in the initial CBCT.

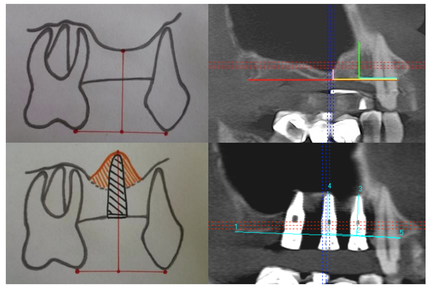
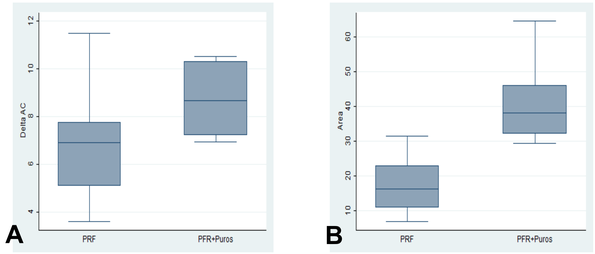
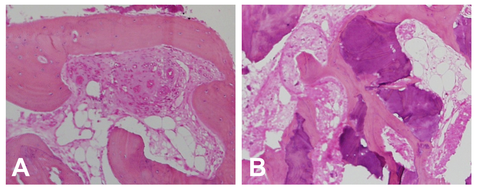


Image showing the procedure for determining the sites measured for height gain. After standardization, the site that crosses the major axis of the implant (final CBCT) is replicated in the initial CBCT.

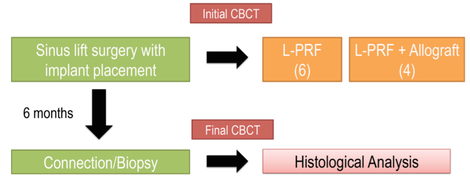


A. Bone gain in height (ΔAC) for the group of L-PRF was 6.82 ± 2.43 mm and 8.71 for group B ± 1.50 mm, a difference that was statistically significant (P = 0.004). B. Area of graft material in the CBCT slice, for group A was 17.34 ± 8.23 mm² and group B was 41.43 ± 13.09 mm², a difference that was statistically significant (P< 0.0001).

Results: Six maxillary sinuses (60%) received L-PRF as unique grafting material with 8 implants (57.14%) in 6 patients and 4 maxillary sinuses (40%) received the combination of L-PRF plus an allograft with 6 implants (42.85%) in 4 patients. The bone gain in height (ΔAC) for group A was 6.82 ± 2.43 mm and 8.71 ± 1.50 mm for group B. This difference is statistically significant (P = 0.004). The surface area of newly formed tissue for group A was 17.34 ± 8.23 mm² and for group B was 41.43 ± 13.09 mm². This difference also shown statistical significance (P < 0.0001). Histological analysis: Group A showed the aspect of normal mature bone with organized trabecular type appearance and dense collagenous matrix. Group B showed a predominance of allograft particles. The success rate was 100% for group A and 83.33% for group B.



A. Group A showed abundant organized mature vital bone with a dense collagen matrix, which represents the appearance of normal bone tissue. Osteocytes and blood vessels are observed. B. Group B, showed mature bone tissue surrounding the granules of allograft.



Scheme of the methodology used in the study.

Conclusion: L-PRF as grafting material develops new bone of better quality (histologically), but in a smaller amount (radiologically) than the bone obtained from the association of L-PRF and an allograft, for the sample. The use of L-PRF as unique filling material in sinus procedures could be a valuable treatment option as demonstrated in this randomized clinical trial, however further studies with largest number of cases allow us to draw conclusions based on stronger evidence.

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