

Impact of Lateral Window Dimensions on Vital Bone Formation After Maxillary Sinus Floor Augmentation: A Systematic Review

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Background

Lateral-window sinus floor elevation (LSFE) is a predictable method for augmenting bone height in the atrophic posterior maxilla. However, implant survival and graft maturation may be influenced by the size of the bony access window.

This systematic review aimed to evaluate current evidence on whether the size of the lateral window can affect the proportion of bone formed or volumetric bone gain, compared with conventional larger windows in LSFE procedures.

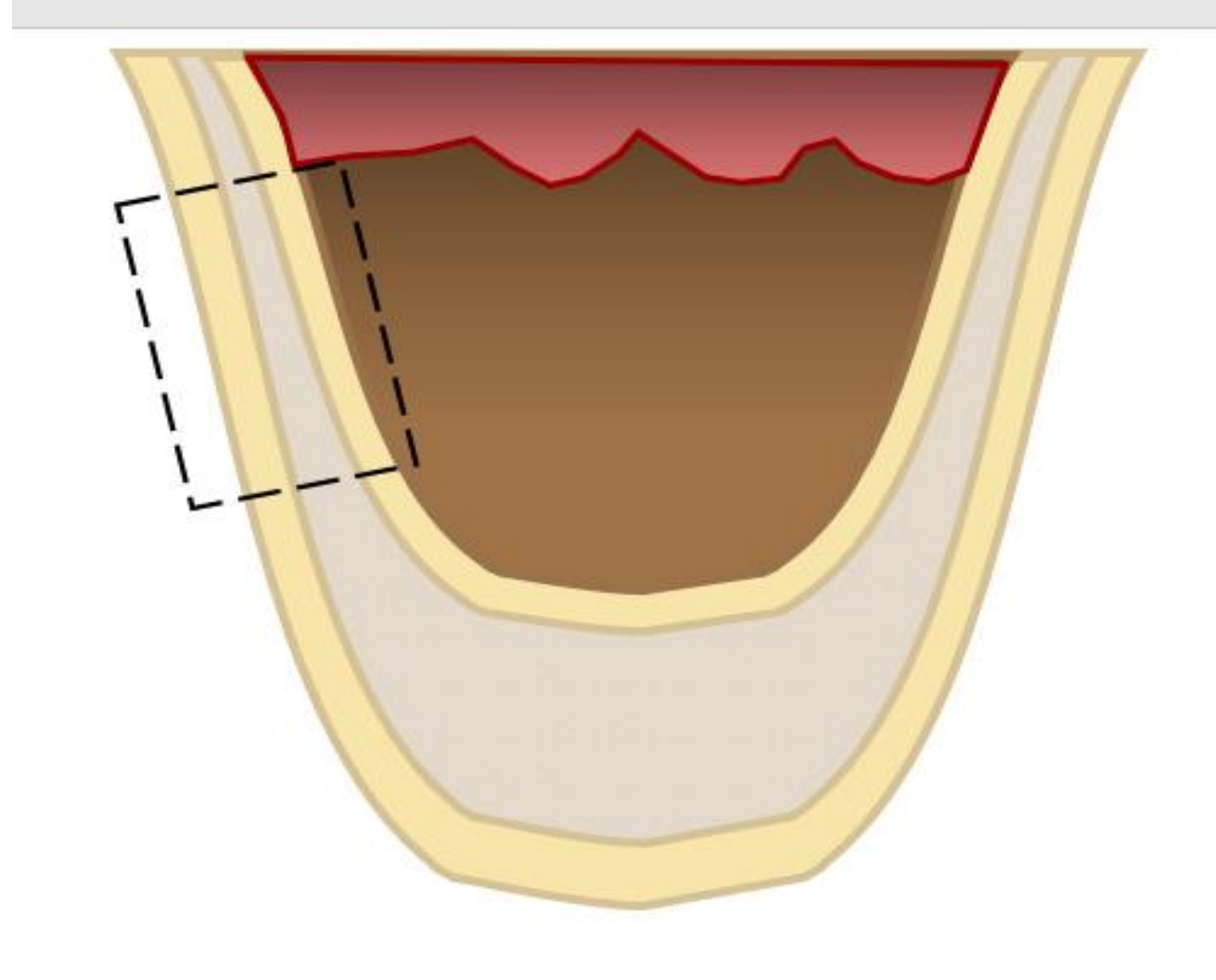


Figure 1. Cross-sectional schematic of the maxillary sinus before grafting. The dashed rectangle marks the outline of the lateral osteotomy ("window") that will be created.

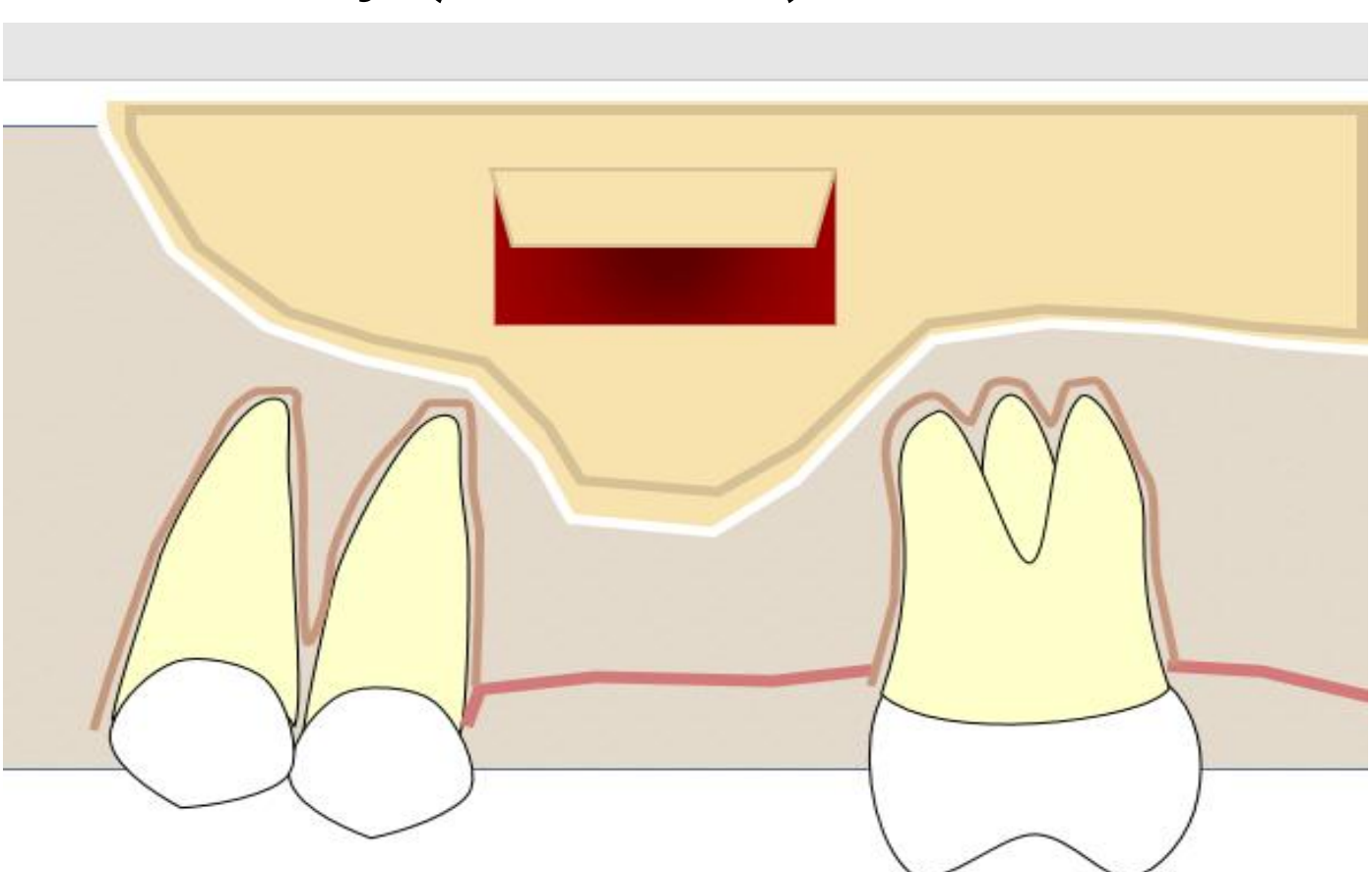
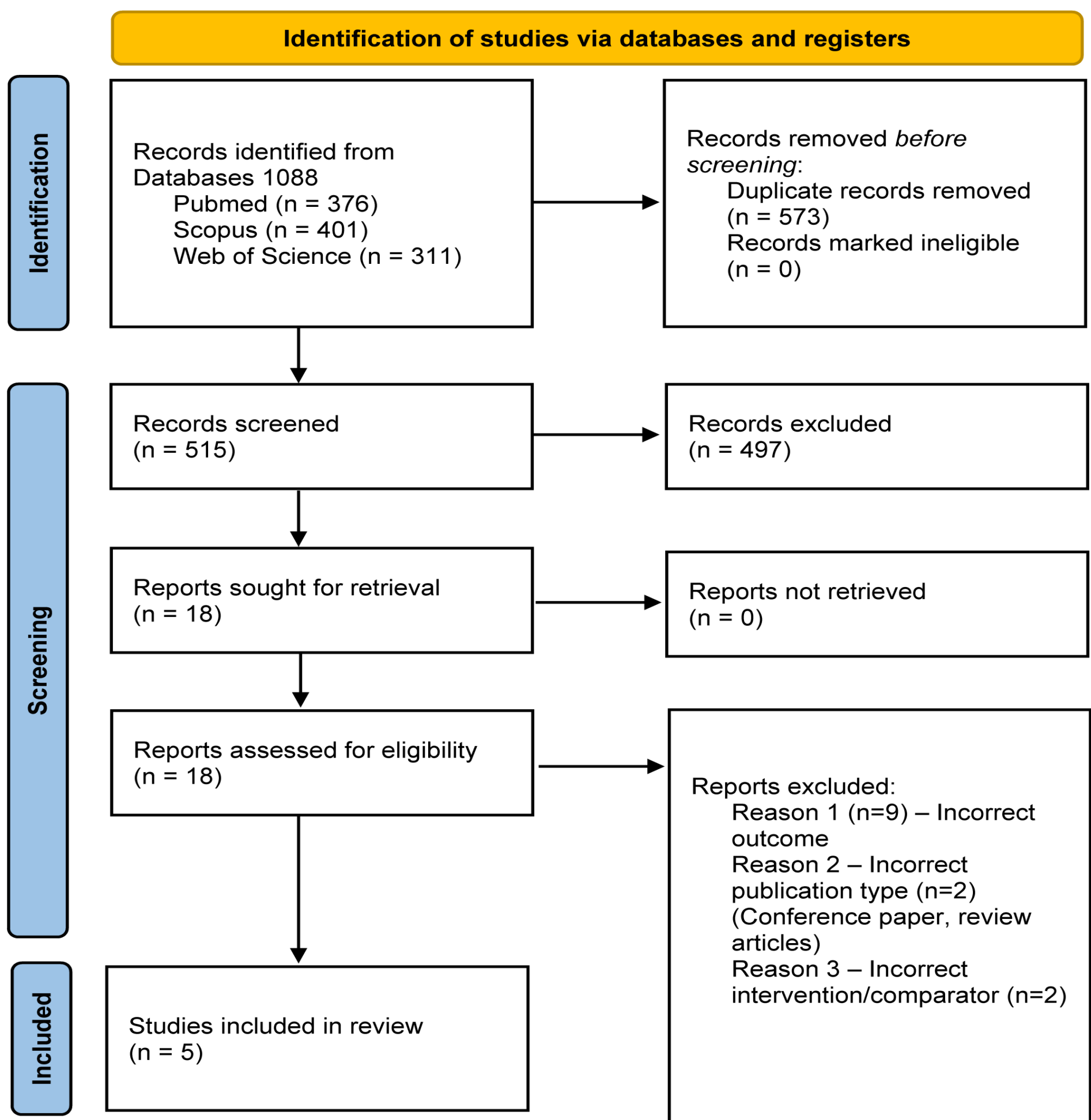


Figure 2. Schematic clinical view of a lateral window osteotomy prepared in the buccal wall of the maxillary sinus for a minimally-invasive sinus-lift.

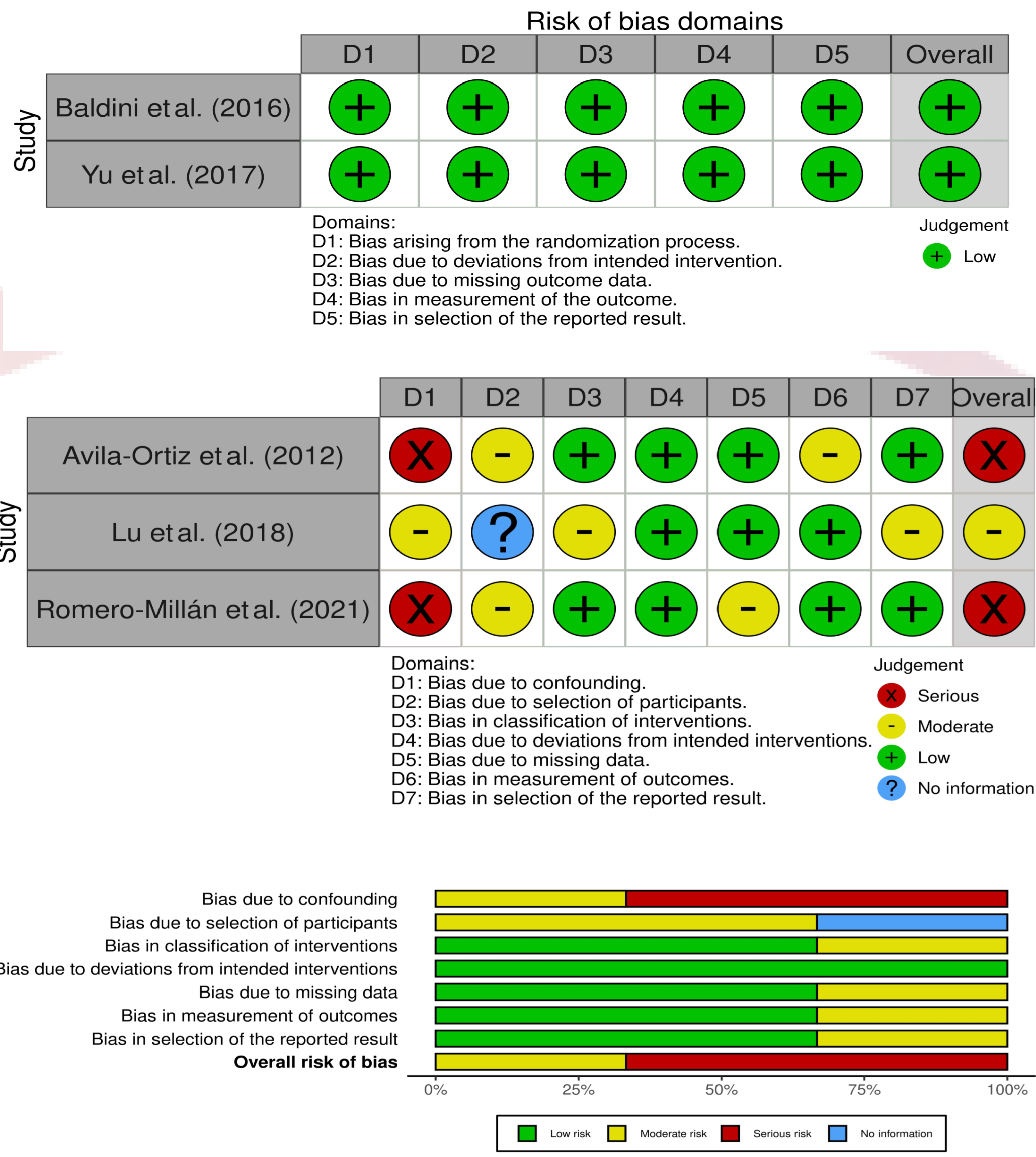
Methodology

This review was conducted following PRISMA guidelines. Electronic databases of PubMed, Scopus, and Web of Science were searched with no date restrictions in March 2025. Studies published in English that compared different lateral-window designs and their effect on bone formation and radiographic sinus-bone gain (height/volume) were selected for inclusion.

Risk of bias was appraised with the Cochrane Risk of Bias 2 tool (ROB 2) or ROBINS-I for non-randomized studies.



Results



Out of 1088 search results, five eligible studies (two split-mouth RCTs, one parallel-group RCT, two retrospective cohorts (221 sinuses, 219 implants) were included. Overall risk of bias was judged “some concerns” to “moderate”.

Most investigations demonstrated an inverse correlation between window area and vital-bone percentage. However, a small subset of studies found no statistically significant impact of window dimensions on radiographic bone formation. The influence of lateral window size on bone regeneration may not be isolated. Other factors such as graft composition, membrane management, and patient-specific healing responses may also modulate bone gain.

Conclusion

Within the limitations of our review, limited evidence suggests that downsizing the lateral window does not reduce sinus-bone gain, but may increase the proportion of vital bone inside the augmented area.

The impact of window size should therefore be considered in conjunction with other surgical and patient-related factors when planning LSFE.

Key Points

Smaller lateral windows in sinus augmentation may lead to a higher percentage of new bone formed.

Factors such as the type of graft material, how the membrane is handled, and the patient’s individual healing ability, can influence the final bone outcome.

References

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